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Hard Red Spring Wheat Quality Report

Physical, Chemical, Milling, and Baking Characteristics



1994 Crop

United States Department of Agriculture
Agriculture Research Service
RRVARC, Fargo, North Dakota

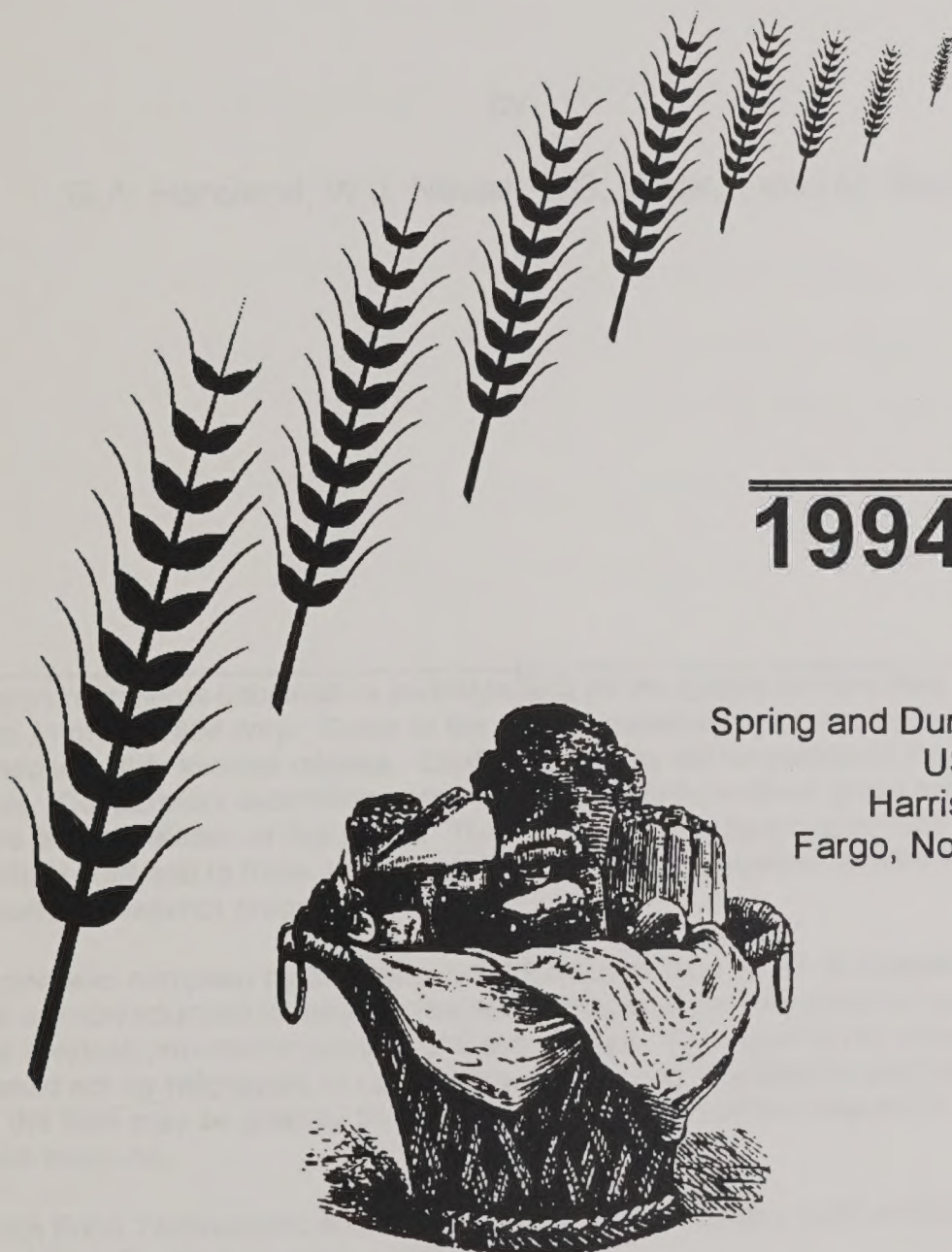
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Hard Red Spring Wheat Quality Report

Physical, Chemical, Milling, and Baking Characteristics



1994 Crop

Spring and Durum Wheat Quality Lab
USDA/ARS
Harris Hall, NDSU
Fargo, North Dakota 58105

United States Department of Agriculture
Agriculture Research Service
RRVARC, Fargo, North Dakota

- not for publication -

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
in cooperation with
STATE AGRICULTURAL EXPERIMENT STATION

QUALITY EVALUATION OF HARD RED SPRING WHEAT CULTIVARS

1994 CROP^{1/}

by

G.A. Hareland, W.J. Newell, J.G. Wear,^{2/} and M. Skunberg^{3/}

^{1/} This report represents cooperative investigations on the quality of Hard Red Spring Wheat cultivars from the 1994 crop. Some of the results presented have not been sufficiently confirmed to justify varietal release. Confirmed results will be published through established channels. Cooperators submitting samples for analysis have been given analytical data on their samples prior to release of this report. This report is primarily a tool for use by cooperators and their official staff and to those individuals having direct and special interest in the development of agricultural research programs.

This report was compiled by the Agricultural Research Service, U. S. Department of Agriculture. Special acknowledgment is made to the North Dakota State University for use of their facilities and the services provided in support of these studies. The report is not intended for publication and should not be referenced in either literature citations or quoted in publicity and advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

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1994 COOPERATING AGENCIES AND STATIONS

The cooperative agencies and stations conducting the varietal plot and nursery experiments from which the 1994 spring wheat samples were received are listed below:

Idaho Agricultural Experiment Station

Aberdeen, Tetonla

Minnesota Agricultural Experiment Station

Morris, St. Paul

Montana Agricultural Experiment Station

Bozeman, Havre, Sidney

North Dakota Agricultural Experiment Station

Minot, Langdon, Dickinson, Casselton,
Carrington, Prosper, Williston

South Dakota Agricultural Experiment Station

Brookings, Groton, Selby

Washington Agricultural Experiment Station

Pullman

Wisconsin Agricultural Experiment Station

Madison

Wyoming Agricultural Experiment Station

Powell

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by R. H. Busch, et al., Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1994.^{4/}

^{4/} Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1994. Agricultural Research Service, U. S. Department of Agriculture and State Agricultural Experiment Station, St. Paul, MN.

INTRODUCTION

Samples of standard cultivars and new selections of hard red spring wheat grown in cooperative experiments in spring wheat regions of the United States are milled each year by the USDA/ARS, Wheat Quality Laboratory. Wheat and their corresponding flours are evaluated for physical and chemical properties, and the flours are baked to determine bread characteristics. The purpose of this report is to make available to the cooperators and other interested parties, quality data on the standard varieties and new selections of hard red spring wheat from the 1994 crop.

The evaluation of a wheat sample involves the analysis of kernel characteristics, milling performance, and baking performance. A brief description of testing methods employed is shown on pages 9-12. No specific comments are made regarding mixogram patterns derived from samples. However, reference mixograms, shown on page 17, illustrate ranges from which sample mixograms may be compared.

SOURCE OF THE 1992 CROP SAMPLES

Tests were performed on 1211 samples which were received from 24 stations in 10 states. However, data on 625 samples is excluded from this report, because the information was of interest only to plant breeders at specific experiment stations.

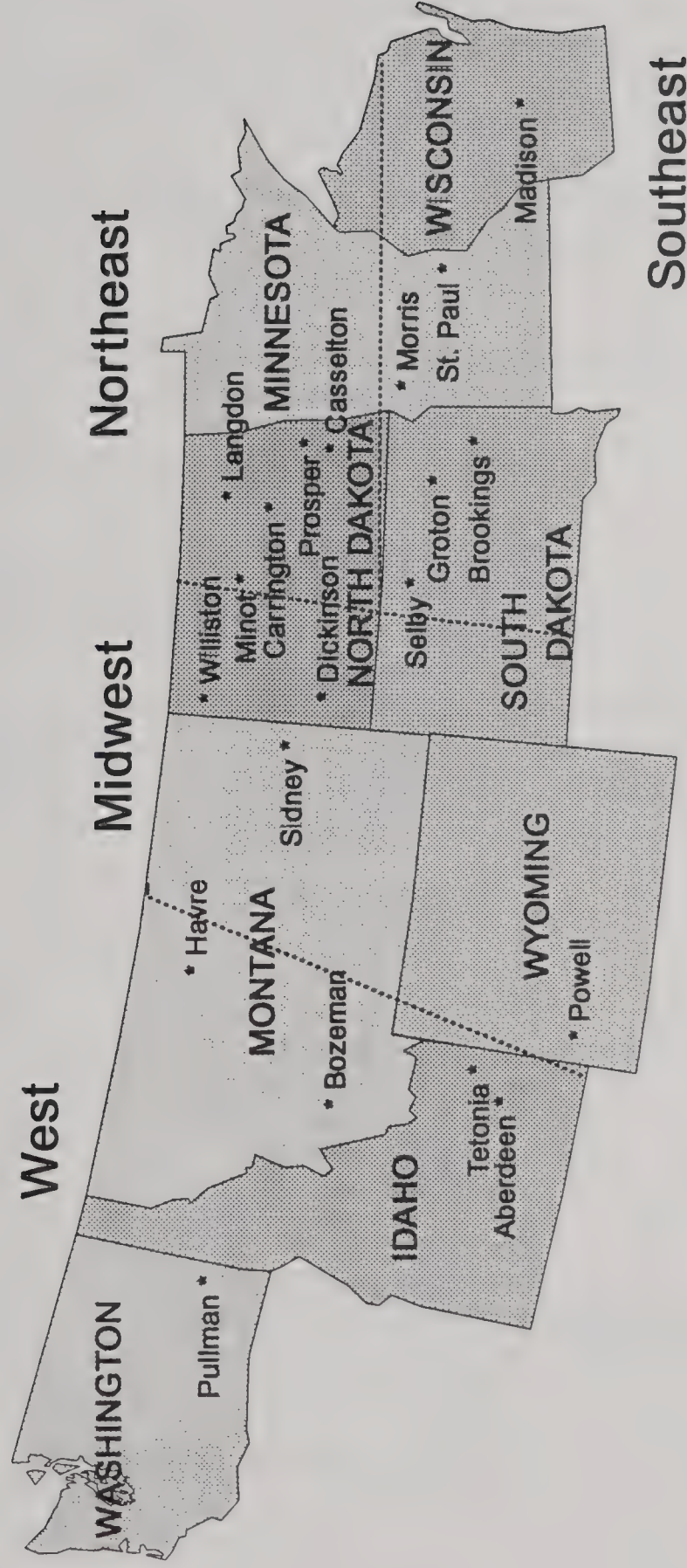
Data presented in this report represents the evaluation of spring wheats received from Field Plot Nurseries and Uniform Regional Nurseries. The following stations were cooperators:

Idaho:	Aberdeen, Teton
Minnesota:	Morris and St. Paul
Montana:	Bozeman, Havre, Sidney
North Dakota:	Minot, Langdon, Dickinson, Casselton, Williston, Carrington, Prosper
South Dakota:	Brookings, Groton, Selby
Washington:	Pullman
Wisconsin:	Madison
Wyoming:	Powell

UNIFORM REGIONAL NURSERY TRIALS

The geographical areas from which the samples were received are shown on page 7. Spring wheat cultivars and experimental lines included in the Uniform Regional Nursery trials are listed on page 8. The Northeast area included 4 stations; the Southeast area included 6 stations; the Midwest area included 4 stations; and the West area included 5 stations.

Hard Red Spring Wheat Nurseries



ENTRIES IN THE UNIFORM REGIONAL HARD RED SPRING WHEAT PERFORMANCE NURSERY

The 32 entries in the 1994 URHRSWPN are listed below:

Entry No.	Cross or Variety	CI No. or Selection No.	Year Entered	Source
1.	Marquis	3561	1929	Canada
2.	Chris	13751	1969	USDA-MN
3.	Era	13986	1972	USDA-MN
4.	Stoa		1987	ND
5.	Butte 86		1987	ND
6.	SD0007	MN7663/SBY354A	1994	SD
7.	SD0010	YW352/SBZ004A	1993	SD
8.	SD0014	YW352/SBZ004A	1994	SD
9.	SD3151	SD3036//SD8052/SD2971	1994	SD
10.	SD3156	Butte 86/SD8061	1994	SD
11.	SBE0437	MN7663/SBY354A	1993	USDA-MN
12.	MN90138	MN86400/MN86033	1994	USDA-MN
13.	MN91227	MN87003/MN86497	1994	USDA-MN
14.	MN91309	SBI0037	1994	USDA-MN
15.	MN91324	SBI0072	1994	USDA-MN
16.	MN92006	Marshall/MN88076	1994	USDA-MN
17.	SBE0050	W8814/Norak	1994	USDA-MN
18.	ND673	Grandin/Stoa 'S'	1992	ND
19.	ND674	Grandin*2/ND6453	1993	ND
20.	ND677*	ND622*2/Cutless	1993	ND
21.	ND678	Stoa'S'/3/IAS20*4/H567.71 //Amidon	1993	ND
22.	ND686	Grandin'S'/3/Colonia S/Amidon//Grand	1994	ND
23.	N90-0671	Bergen/N86-0111	1993	AGPRO
24.	N90-0666	Bergen/N86-0111	1993	AGPRO
25.	N90-0700	Prospect/Amidon	1993	AGPRO
26.	N89-0562	CNO'S'/7C/3/B.RE//BA PET/ANB	1994	AGPRO
27.	N91-0059	HS85-510/Success	1994	AGPRO
28.	N90-0392	HS85-0476/HS84-0700	1994	AGPRO
29.	N91-3057	B85-1525/Krona	1994	AGPRO
30.	BW688	BW608/Norseman	1994	AGCAN
31.	BW173	COL*2//Saric/NEP/3/COL*5//Saric/NEP	1994	AGCAN
32.	BW174	COL*2//Saric/NEP/3/COL*5//Saric/NEP	1994	AGCAN

* Solid stem lines for sawfly resistance,

METHODS

Following are the variables and testing methods used in the evaluation process:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry wheat subsequent to passing the sample through a Carter-Day dockage tester.

1000-Kernel Weight - The weight of 1000 kernels was determined by counting, using a Seedburo seed counter, the number of kernels in 10 g samples of cleaned, hand-picked wheat.^{5/}

Kernel Size - The percentages of the size of kernels (large, medium and small) were determined using a wheat sizer as described by Shuey^{6/}.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm opening
Middle Sieve - Tyler #9 with 2.24 mm opening
Bottom Sieve - Tyler #12 with 1.65 mm opening

Milling - The samples were cleaned by passing the wheat through a Carter-Day dockage tester and through a modified Forster scourer (Model 6). The clean, dry samples were pretempered to 12.5% moisture for at least 72 hours, then tempered to 15.5% moisture and allowed to stand overnight prior to milling.

^{5/} Mention of a trademark name or a proprietary product does not constitute a guarantee or warranty of the product by the U. S. Department of Agriculture, and does not imply its approval to the exclusion of other products that may also be suitable.

^{6/} Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72,75 (1960).

The Uniform Regional Nursery spring wheat samples were milled in Brabender Quadrumat Senior mill heads. The stock from the Break head was sifted for 60 sec on a strand sifter using #35 and #80 Tyler sieves. The throughs of the #80 sieve were classified as break flour; the overs of the #35 sieve classified as bran; and the overs of the #80 sieve were passed through the reduction head of the mill. The reduction stock was sifted for 60 sec on a #80 Tyler sieve. The throughs were classified as reduction flour and the overs as shorts. The break and reduction flours were combined and classified as patent flour.

The Field Plot Nursery samples were milled in a Buhler continuous experimental mill. The Buhler mill had been slightly modified for better comparison with commercial milling operations. Break scalping sieves were clothed with #54 stainless steel wire. Reduction scalping sieves were clothed with #58, #66 and #105 stainless steel wire for the first, second and third reductions, respectively. All flour sieves were clothed with #135 stainless steel wire.

The six flour streams obtained from the Buhler-milled wheat were combined and classified as patent flour. The extraction of a good milling wheat using this flow is approximately 68% and is comparable to a commercial "long patent" extraction flour. At a 68% flour extraction, changes in flour ash are most sensitive to changes in percent extraction.

Hardness Test - Wheat hardness scores were determined according to AACC Method 39-70A. The procedure involved grinding the wheat samples in a Udy grinder and obtaining reflectance data from a Technicon 450 near infrared analyzer. Wavelengths used were 1680 nm and 2230 nm. This procedure was developed by Mr. Karl Norris, USDA, Beltsville through a co-operative research project in which the Hard Red Spring and Durum Wheat Quality Laboratory also participated. Hard red spring wheats generally have NIR scores between 60 and 85.

SKWCS Hardness Index - The single kernel wheat characterization system (SKWCS) instrument (developed by the GMRL, Manhattan, KS) was used to determine the hardness index and the percent distribution of kernels that were classified as soft, semi-soft, semi-hard, and hard.

Protein Content - Wheat and flour proteins were determined from NIR reflectance data, the Kjeldahl procedure, or Leco Nitrogen determinations. Nitrogen values, as determined the Kjeldahl procedure or Leco, were multiplied by 5.7 to calculate protein values. Values were reported on a 14%mb.

Mineral or Ash Content - Wheat or flour ash was determined by measuring the residual weight of minerals remaining after incinerating the sample for approximately 16 hours at 575°C. The results were reported as percentages of the sample weights. Values were reported on a 14%mb.

Mixograph Analysis - Mixograph data was determined on each flour sample by using 30 g of flour (as is mb) and adding 20 cc of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Water absorptions were adjusted according to the peak heights of the mixograms. Correction factors were determined from a series of flours by varying the amount of absorption.

Mixogram Patterns - Reference mixogram patterns shown on page 17 illustrate different dough characteristics. A single number is assigned each pattern to characterize and simplify the classification of the curves. The larger numbers indicate stronger curve characteristics.

Baking Procedure and Formula - Following is the baking formula used:

100% flour	3% Non-fat Dry Milk
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted) - 100 g loaves
	1% shortening (Crisco, melted) - 25 g loaves

Samples were mixed to optimum dough development in National Manufacturing mixers, the micro mixer for 25 g samples and the 100 g special mixer for 100 g samples. Bromate (10 ppm) for oxidation and Fungal Amylase (Doh-Tone)(15SKB units) for enzymatic supplement were added to each sample. All doughs were moulded in a Roll-Er-Up moulder. Samples undergo 3 hour fermentation, 1 hour proof and 20 minute bake time.

Absorption - The amount of water, expressed as percent of flour, required for optimum dough consistency.

Dough Characteristics (DC) - Empirical scores ranging from 0-6 were used to classify dough as sticky-weak (0), pliable (2), elastic (3), or bucky (6). The most favorable rating for optimum bread characteristics would be elastic.

Crumb Color (CC) - A value was determined by comparing the internal crumb color of the sample bread with the crumb color of a baking standard. The standard flour was an equal blend of the variety Grandin grown at Casselton and Minot, ND, and Crookston, MN, and Brookings, SD. Empirical scores ranging from 0-6 were used to classify crumb color as yellow (0), grey (2), dull (3), creamy (5), or bright white (6).

Crumb Grain (CG) - Empirical scores ranging from 0-6 were used to classify crumb grain as irregular, thick (0), open, thick (3), or fine (6).

Crumb Texture (CT) - Empirical scores ranging from 0-6 were used to classify crumb texture as harsh (0), coarse (3), or silky (6).

Loaf Volume - The volume (cc) of the baked loaf as determined by rapeseed displacement.

DISCUSSION

The following discussion presents the basic techniques and criteria used in the quality evaluation of the Hard Red Spring Wheat cultivars.

For the Uniform Regional Nursery samples, each quality variable (except for bake absorption, mix time, and CG) per sample was averaged within each hard red spring wheat region (Northeast, Southeast, Midwest, and West). Values that are bolded/underlined indicate that averages are higher than the standard (Butte 86). For wheat and flour ash, bolded/underlined values are lower than the standard.

All samples were compared with a milling and baking standard representative of the crop year. Agronomic and climatic conditions of the individual locations can affect the quality of the wheat such that the evaluation of all samples, including commercial cultivars, harvested from these locations may be classified as questionable to unsatisfactory. For example, an area may produce low protein wheat with large and plump kernels, good milling performance, and good kernel characteristics, but with low flour protein and unsatisfactory baking performance such as short mixing time, low loaf volume, and weak dough characteristics. The wheat from this area could not be considered a strong spring wheat and would not maintain the quality expected from the spring wheat producing area. An acceptable variety should have tolerance to a wide range of environmental conditions.

Kernel Characteristics are important in determining the initial value of wheat. Poor kernel characteristics could disqualify a new variety from further consideration. Because of the present wheat grading system, high test weight is desirable. Plump kernels are desirable because of their high ratio of endosperm to bran. Low 1000-kernel weight and small kernel size distribution affect milling performance due to their high ratio of bran to endosperm. Wheat ash is an important factor when comparing one cultivar against other standard cultivars. Wheat with a high mineral content may yield flour with a high ash content. Wheat protein quality and quantity must be considered as important characteristics when comparing cultivars grown at the same location. Wheats with low protein values are undesirable since protein affects baking performance.

Milling Performance is a very important characteristic of spring wheats. Low extraction and high flour ash are major factors that are unacceptable under commercial milling operations. As a general rule, an increase of 0.01% in ash content is equivalent to an increase of approximately 2% in flour extraction.

Milling characteristics: Wheat comprising soft kernels requires different milling techniques when compared with wheat of uniform hard kernels. With commercial mills flowed for hard vitreous spring wheats, the introduction of soft wheats into the mill will result in milling problems. Likewise, a sample which is extremely hard and vitreous will mill differently. Both types of wheat (soft and vitreous) require different roll pressures, clothing, sifter surface, and temper to be milled properly. The blending of normal bread wheats with soft wheats or extremely hard, vitreous wheats is undesirable since they are not compatible in the milling operation. Adjustments would either have to be made in the milling flow or in tempering procedures to compensate for differences in kernel hardness. Properties of soft wheat may or may not be compatible with other wheats. Therefore, maintaining pure varieties with uniform milling characteristics is important.

The amount of protein recovered in flour from wheat is important. High protein wheats yielding low protein flours are not desirable. Such wheats would contain much of the protein distributed in the outer portion of the kernels resulting in excessive protein in the feed streams. Therefore, higher protein wheat would be necessary to yield a flour with protein content comparable to that of a wheat that yields optimum flour protein.

Mixogram patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. From the standard mixogram patterns (page 17), patterns 6 - 8 indicate flours with optimum mixing tolerance and gluten strength. Mixogram patterns 9 - 11 indicate flour samples with long mixing times, and strong gluten characteristics, whereas, patterns 1 - 5 indicate flours with weak gluten characteristics and short mixing times. Both the pattern and length of the curve are important, and both must be considered in the evaluation. Abnormal curves, such as sway-back or long initial times to incorporate water, indicate undesirable characteristics.

Baking evaluation takes into account the flour water absorption, mixing time, dough characteristics, loaf volume, crumb texture, and machinability. Flour samples with low water absorptions would be unsatisfactory. Samples with extremely short mixing times would relate to weak gluten characteristics and be considered undesirable.

The crumb grain or appearance of the interior of the loaf indicates the structural integrity during baking. Crumb grain is likely related to gluten protein properties (quantity and quality).

Bread loaf volume indicates potential strength of doughs in a different manner than mixing time or dough characteristics. Optimum loaf volume demonstrates the capacity, or lack thereof, for the dough to expand under pressure and to contain the entrapped gases during expansion. Weak doughs tend to collapse and yield breads with low loaf volumes, or yield breads with extremely large volumes containing large holes in the interior. Low protein flours produce extensible doughs that do not expand adequately

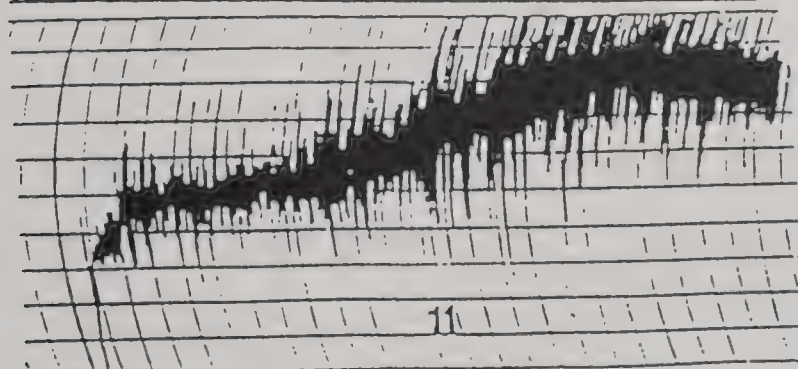
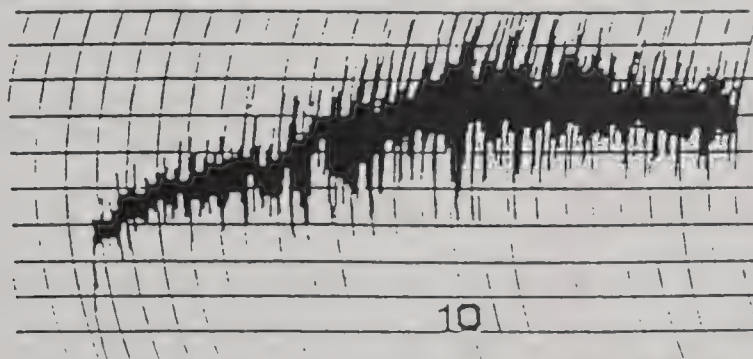
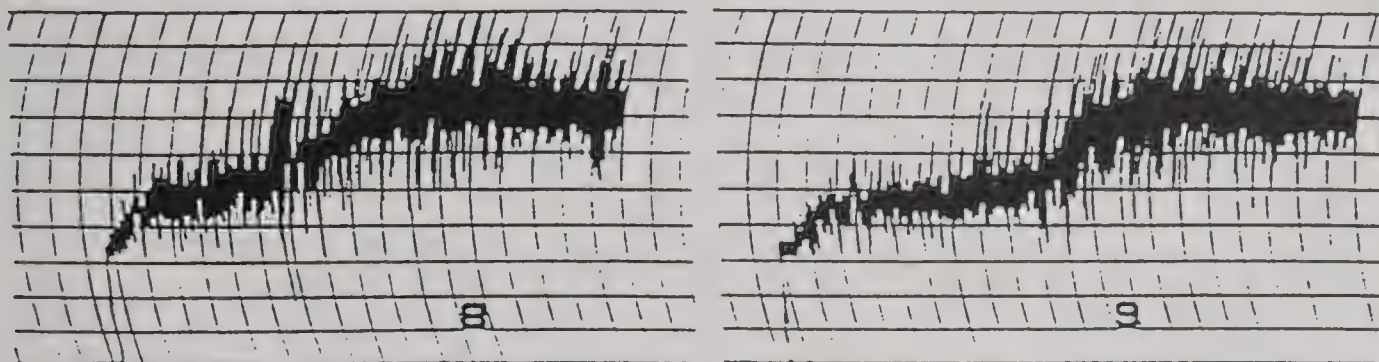
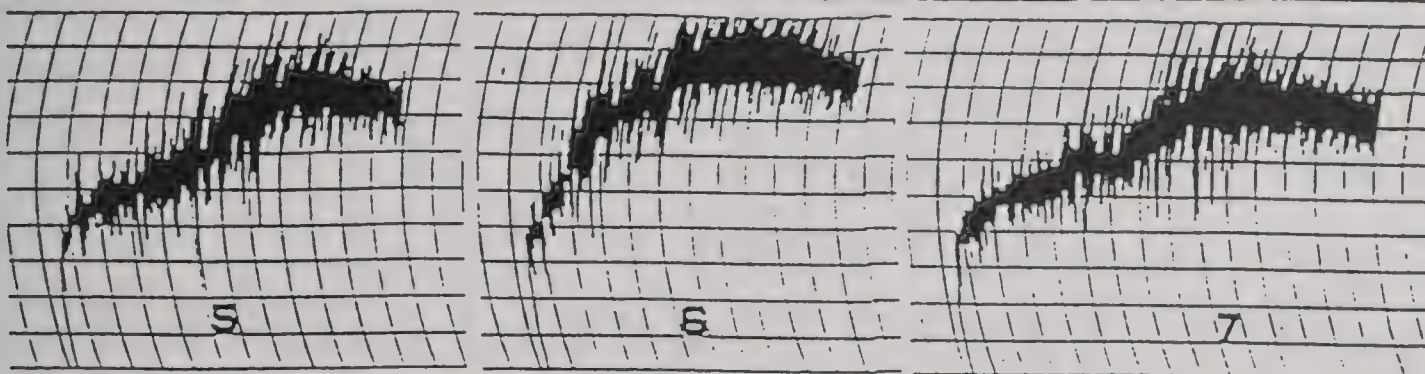
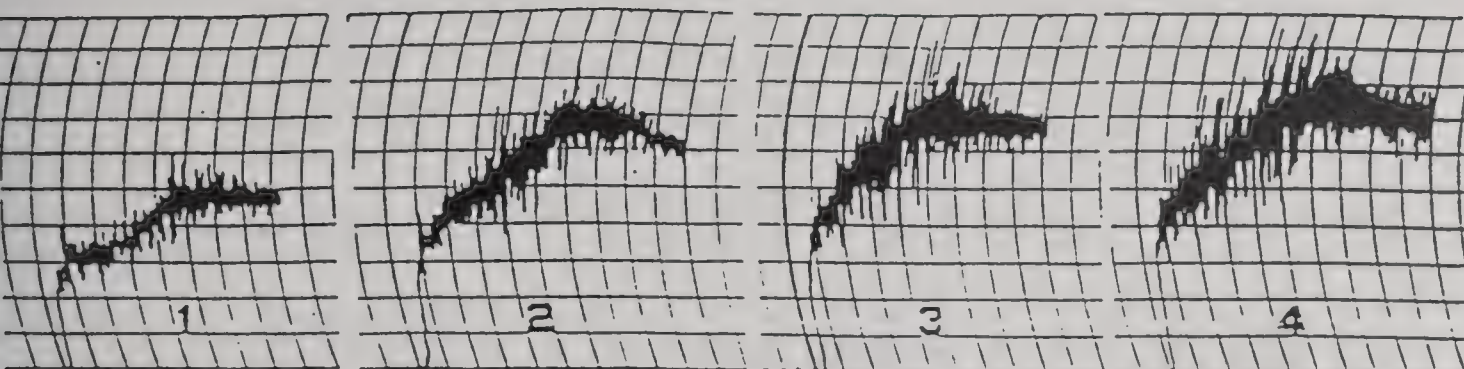
during fermentation or baking and thus produce bread with low loaf volumes. Tough and very bucky doughs are bound too tightly and impede expansion of the gases resulting in breads with low loaf volume. Loaf volume is a characteristic probably related to gluten functionality in the dough.

UNIFORM REGIONAL NURSERY SAMPLES - 1994 CROP

A total of 586 samples were received from 19 stations in 8 states. Twenty-seven selections were experimental lines and the remainder were commercial cultivars. Commercial cultivars included Butte 86 (used as the standard for comparison), Chris, Era, Marquis, and Stoa. Each sample was evaluated for kernel characteristics, milling performance, and breadmaking properties.

Tables 1-4 include data from the Northeast area; table 5-10 include data from the Southeast area; table 11-14 include data from the Midwest area; and table 15-19 include data from the Western area. Averages for each area are included in tables 20-23.

STANDARD MIXOGRAPH PATTERNS



1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 1

LOCATION: *Carrington, ND*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating-----					LOAF VOL (cc)		
					DISTRIBUTION					PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	ABS						PAT	C	C	C	G		T	
					A	B	C	D																				INDEX
Marquis	59.7	29.0	37	3	3	6	32	59	63.8	77	13.8	1.54	64.9	13.0	0.37	57.9	3	57.9	4.00	3	3	3	5	5	182			
Chris	59.1	28.4	34	3	0	6	23	71	66.0	71	15.2	1.49	65.6	14.9	0.40	60.8	3	60.8	3.75	3	3	3	5	5	187			
Era	54.9	26.8	24	7	1	2	7	90	75.2	69	13.0	1.63	66.5	11.9	0.44	54.6	2	54.6	4.50	3	4	4	4	4	203			
Stoa	59.0	29.4	35	3	1	3	17	79	70.6	65	14.7	1.64	66.5	14.1	0.35	60.5	4	60.5	5.00	3	4	4	4	5	198			
Butte 86	60.0	34.5	58	1	2	2	22	74	67.6	74	14.4	1.63	67.0	13.4	0.37	60.5	3	60.5	3.25	3	4	4	4	5	200			
SD0007	59.7	30.5	55	2	2	9	29	60	62.5	68	13.8	1.67	69.9	12.9	0.35	60.5	3	60.5	4.00	3	3	3	5	5	210			
SD0010	58.1	28.7	29	4	1	6	24	69	67.1	65	14.0	1.60	69.2	13.1	0.37	59.6	3	59.6	4.50	3	0	3	5	5	207			
SD0014	57.4	29.7	46	3	1	4	19	76	68.8	69	14.2	1.60	68.8	13.4	0.38	60.3	3	60.3	4.50	3	2	3	5	5	203			
SD3151	59.6	29.7	21	4	3	6	27	64	63.0	64	15.0	1.75	63.4	14.8	0.39	57.6	3	57.6	5.00	3	0	3	5	5	192			
SD3156	61.4	31.7	48	2	1	8	29	62	63.6	65	14.3	1.65	66.6	13.3	0.36	57.9	3	57.9	4.00	3	4	3	5	5	190			
SBE0437	59.4	31.1	50	2	0	4	22	74	67.1	72	14.1	1.57	67.9	13.3	0.36	57.9	2	57.9	4.00	3	4	3	5	5	198			
MN90138	57.7	37.2	63	1	1	4	20	75	67.2	74	14.7	1.78	67.1	13.1	0.45	57.6	3	57.6	4.00	3	3	3	5	5	204			
MN91277	59.0	30.5	46	3	1	10	28	61	62.6	48	13.4	1.66	65.0	13.1	0.37	55.0	1	55.0	3.50	2	0	6	5	5	197			
MN91309	59.1	29.4	24	4	2	11	26	61	63.8	63	14.0	1.65	68.0	12.9	0.38	58.2	3	58.2	4.50	3	4	5	5	5	207			
MN91324	59.0	27.8	23	6	1	1	9	89	75.4	73	14.4	1.80	67.8	13.7	0.44	60.5	3	60.5	4.00	3	4	3	5	5	210			
MN92006	60.0	29.7	42	3	4	15	31	50	59.3	54	13.9	1.56	69.0	13.5	0.41	55.0	2	55.0	3.50	3	4	5	4	4	187			
SBE0050	58.2	26.7	11	7	0	2	7	91	78.1	59	13.1	1.59	68.0	12.6	0.37	56.2	3	56.2	6.50	2	3	5	5	5	193			
ND673	60.4	32.9	56	2	0	3	21	76	67.8	61	14.9	1.63	69.1	14.4	0.34	60.8	4	60.8	4.50	3	4	4	4	5	198			
ND674	61.2	30.9	52	2	1	2	14	83	70.6	68	15.7	1.66	67.3	15.4	0.36	61.1	5	61.1	5.00	3	0	2	5	5	207			
ND677	60.1	31.1	45	3	3	13	34	50	59.3	62	15.1	1.65	67.1	14.8	0.36	60.3	3	60.3	4.00	3	4	3	5	5	208			

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 1(cont)

FARGO, ND

LOCATION: *Carrington, ND*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS		NIR HARD- NESS	WHEAT (14% mb)		FLOUR EXT (%)		FLOUR PRO ASH (14 % mb)		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	-----Rating-----					LOAF VOL (cc)
					A	B	C	D	INDEX		PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	C						C	C	G	T		
ND678	60.5	27.8	28	5	1	3	6	90	77.5	73	14.9	1.72	67.0	14.0	0.35	59.6	3	59.6	3.50	3	5	3	5	201			
ND686	59.9	29.0	21	2	0	2	18	80	70.6	68	14.3	1.64	69.0	13.6	0.35	59.3	4	59.3	4.50	3	4	3	4	193			
N90-0671	57.4	28.9	49	2	1	3	23	73	68.5	64	13.3	1.60	69.1	12.4	0.38	56.9	3	56.9	5.50	3	0	6	5	189			
N90-0666	58.7	31.8	61	2	2	14	32	52	59.3	63	14.3	1.64	69.8	13.8	0.42	59.0	3	59.0	4.50	3	0	3	4	189			
N90-0700	57.6	26.1	17	6	0	2	4	94	79.7	70	13.8	1.55	66.6	13.3	0.35	60.5	4	60.5	4.50	3	4	3	5	206			
N89-0562	58.4	30.6	24	4	1	7	23	69	65.9	62	15.2	1.95	64.0	14.7	0.42	60.0	3	60.0	3.25	3	4	4	5	192			
N89-0059	57.0	32.3	23	2	2	13	32	53	59.9	52	13.7	1.53	66.4	13.0	0.36	59.6	2	59.6	3.00	3	4	5	5	200			
N90-0392	57.1	31.7	53	3	2	10	28	60	63.0	61	13.0	1.56	68.3	12.0	0.37	58.2	3	58.2	3.50	3	0	4	5	202			
N91-3057	56.6	29.9	23	4	1	7	18	74	68.5	57	13.0	1.64	64.4	12.3	0.47	57.6	2	57.6	4.75	2	0	4	4	213			
BW688	59.7	37.2	73	1	2	18	38	42	57.1	66	15.1	1.61	67.9	14.4	0.39	55.8	2	55.8	4.00	3	0	4	5	200			
BW173	59.8	32.4	50	2	3	13	40	44	58.2	80	16.0	1.58	69.0	15.8	0.38	60.8	3	60.8	3.75	3	4	3	5	183			
BW174	59.7	31.5	48	2	1	8	32	59	62.6	82	15.8	1.65	69.5	15.5	0.37	61.1	3	61.1	3.25	3	4	3	5	182			

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):

CRUMB COLOR (CC):

CRUMB GRAIN (CG):

CRUMB TEXTURE (CT):

0

STICKY-WEAK
YELLOW
IRREG, THICK
HARSH

PLIABLE

GREY

ELASTIC

DULL
OPEN, THICK
COARSE

3

6

BUCKY
BRIGHT WHITE
FINE
SILKY

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 2

LOCATION: Langdon, ND

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS		NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating					LOAF VOL (cc)
					A	B	C	D	INDEX	HARD- NESS		PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14% mb)	C						C	G	T			
Marquis	56.4	30.6	59	2	1	8	25	66	65.3	69	14.5	1.54	66.5	13.7	0.47	59.6	2	59.6	3.00	2	3	4	5	5	200			
Chris	55.0	28.2	44	2	1	3	14	82	73.2	74	15.3	1.68	65.6	15.1	0.45	61.1	3	61.1	3.00	3	3	4	5	5	236			
Era	55.3	25.6	20	7	1	3	12	84	73.7	64	13.4	1.69	68.9	12.8	0.52	57.9	2	57.9	4.00	3	3	5	5	5	206			
Stoa	58.2	31.3	50	2	0	5	19	76	68.8	74	14.7	1.57	68.9	14.6	0.40	60.8	3	60.8	3.75	3	3	5	5	5	207			
Butte 86	58.3	32.3	59	2	2	6	21	71	66.3	64	14.8	1.67	67.8	14.1	0.42	59.3	2	59.3	3.25	3	3	4	5	5	197			
SD0007	56.4	31.1	55	2	0	4	20	76	67.8	70	13.5	1.67	70.7	12.7	0.50	58.2	2	58.2	3.50	3	3	5	5	5	208			
SD0010	56.3	29.0	33	3	0	3	10	87	73.3	59	13.8	1.69	69.5	12.7	0.40	57.9	3	57.9	4.50	3	4	4	5	5	190			
SD0014	55.7	31.1	50	2	1	1	18	80	70.1	70	13.8	1.66	69.0	13.1	0.43	57.3	2	57.3	4.00	3	3	6	6	6	209			
SD3151	59.0	31.3	37	2	1	4	22	73	67.6	62	15.1	1.70	64.7	14.8	0.43	56.5	2	56.5	4.25	3	0	4	5	5	209			
SD3156	59.4	32.2	58	2	2	6	31	61	63.9	59	14.6	1.60	68.2	14.5	0.40	59.6	2	59.6	3.75	3	4	3	5	5	206			
SBE0437	55.3	30.2	48	3	1	6	17	76	70.6	65	14.1	1.76	66.9	13.1	0.46	57.3	2	57.3	3.50	2	4	5	5	5	208			
MN90138	54.7	33.7	55	2	3	3	14	80	70.2	73	14.0	1.81	65.8	12.7	0.55	57.3	2	57.3	3.50	2	4	3	5	5	210			
MN91277	55.7	30.2	47	2	0	2	16	82	70.5	56	13.5	1.79	64.5	12.7	0.48	54.6	1	54.6	2.50	1	4	5	5	5	202			
MN91309	57.9	31.2	33	4	3	9	28	60	63.5	64	13.5	1.64	67.8	13.0	0.43	59.0	2	59.0	4.00	3	5	3	6	6	208			
MN91324	58.3	29.8	40	3	2	5	10	83	70.9	79	14.4	1.72	68.4	13.8	0.46	61.1	2	61.1	3.00	3	4	4	5	5	216			
MN92006	58.5	30.4	41	3	2	6	25	67	64.6	55	12.9	1.56	69.3	12.3	0.40	55.5	2	55.5	3.50	2	3	5	5	5	188			
SBE0050	58.3	32.4	52	2	0	2	11	87	71.9	68	13.4	1.62	66.7	12.6	0.45	57.6	2	57.6	4.50	2	0	4	5	5	207			
ND673	58.6	35.0	64	1	1	2	8	89	74.3	71	14.7	1.70	68.6	14.3	0.77	59.6	3	59.6	5.00	3	3	4	5	5	211			
ND674	58.1	31.3	62	2	1	4	14	81	71.3	67	15.5	1.70	67.3	15.4	0.44	60.0	3	60.0	4.50	3	4	2	5	5	222			
ND677	57.8	30.5	42	4	5	10	36	49	58.7	50	14.5	1.64	67.2	14.5	0.42	59.0	3	59.0	4.00	3	0	5	5	5	217			

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USDA / ARS
WHEAT QUALITY LAB

Table 2(cont)

LOCATION: <i>Langdon, ND</i>										FARGO, ND														
VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					DISTRIBUTION					PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)										
					A	B	C	D							INDEX									
ND678	58.1	29.2	40	3	1	3	12	84	73.4	76	15.0	1.68	66.6	14.3	0.43	59.3	2	59.3	3.50	3	5	4	5	210
ND686	58.7	32.7	58	2	3	3	23	71	66.2	62	14.1	1.51	68.0	13.8	0.41	58.2	2	58.2	4.00	2	4	4	4	200
N90-0671	56.6	31.2	63	2	1	7	20	72	66.7	66	13.5	1.57	68.9	12.5	0.47	55.8	2	55.8	4.50	2	0	4	5	213
N90-0666	56.9	31.3	62	2	17	32	30	21	47.2	68	13.8	1.69	68.8	13.2	0.46	57.9	2	57.9	4.00	3	0	4	5	209
N90-0700	55.9	26.3	23	7	1	2	12	85	76.8	69	13.8	1.58	65.1	13.1	0.43	58.6	2	58.6	4.50	3	4	5	5	204
N89-0562	56.9	36.7	58	2	1	12	31	56	62.8	66	15.2	1.89	64.4	15.0	0.50	58.6	2	62.6	3.00	3	0	4	5	202
N89-0059	53.9	30.1	36	4	4	9	17	70	66.7	57	13.7	1.68	65.8	12.9	0.50	57.3	2	61.0	3.00	3	0	4	5	206
N90-0392	55.6	32.3	56	2	3	6	23	68	64.5	63	12.6	1.66	67.1	11.8	0.49	57.3	2	61.0	4.00	3	4	3	5	207
N91-3057	53.1	29.1	19	6	2	6	15	77	68.9	54	14.2	1.88	62.5	13.7	0.53	60.0	2	60.0	4.00	3	4	4	6	223
BW688	56.8	37.3	77	1	3	18	39	40	56.7	72	15.2	1.61	67.0	14.5	0.40	56.9	2	56.9	3.75	3	3	3	6	206
BW173	57.5	34.6	72	1	1	15	29	55	63.4	82	16.2	1.64	67.9	15.8	0.42	63.1	3	63.1	3.00	3	3	4	5	213
BW174	57.5	33.7	67	1	0	10	34	56	65.8	76	16.0	1.60	69.1	15.9	0.43	62.7	3	63.0	3.25	3	5	4	6	211

DISTRIBUTION: A = % Soft

B = % Semi-Soft

C = % Semi-Hard

D = % Hard

RATINGS:										0			3			6		
DOUGH CHAR (DC):										STICKY-WEAK			ELASTIC			BUCKY		
CRUMB COLOR (CC):										YELLOW			GREY			BRIGHT WHITE		
CRUMB GRAIN (CG):										IRREG, THICK			OPEN, THICK			FINE		
CRUMB TEXTURE (CT):										HARSH			COARSE			SILKY		

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 3

FARGO, ND

LOCATION: *Minot, ND*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS			NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating					LOAF VOL (cc)		
					A	B	C	D	INDEX	HARD- NESS		PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14% mb)	ABS						PAT	ABS	TIME (min)	D C	C G		C T	C T
Marquis	62.2	30.5	53	2	0	6	22	72	66.1	76	14.1	1.37	65.0	13.3	0.30	59.3	3	59.3	3.75	3	3	3	5	5	5	5	180			
Chris	61.8	28.8	43	3	1	5	21	73	68.6	72	14.3	1.45	64.7	13.5	0.29	59.3	4	59.3	4.50	4	2	3	3	3	5	5	176			
Era	60.5	28.4	31	5	0	4	9	87	76.5	68	13.6	1.53	67.4	12.3	0.40	54.9	3	54.9	5.50	3	2	3	4	4	4	4	182			
Stoa	61.7	33.0	59	2	0	2	7	91	76.3	63	14.1	1.44	66.5	13.2	0.33	61.1	5	61.1	5.25	5	3	3	4	5	5	5	183			
Butte 86	62.1	37.5	72	2	0	2	8	90	75.1	77	14.3	1.49	67.1	13.3	0.33	60.8	3	60.8	3.75	3	3	3	4	5	5	5	186			
SD0007	61.4	34.5	68	1	1	6	23	70	65.3	74	13.5	1.42	69.4	12.6	0.31	59.3	3	59.3	5.00	3	3	3	5	5	5	5	185			
SD0010	61.8	34.4	66	1	0	2	13	85	71.8	75	13.8	1.49	69.3	13.2	0.32	60.5	5	60.5	5.25	5	3	3	3	5	5	5	186			
SD0014	61.1	36.5	71	1	1	6	22	71	67.6	81	13.9	1.47	68.8	12.8	0.32	59.3	4	59.3	5.25	4	3	5	4	5	5	5	182			
SD3151	61.5	32.5	49	2	0	3	9	88	72.8	61	15.5	1.57	61.7	14.9	0.38	58.2	3	58.2	5.75	3	4	5	5	5	5	5	183			
SD3156	62.9	34.6	70	1	0	2	18	80	71.5	61	13.6	1.44	66.1	12.9	0.30	58.6	4	58.6	4.50	4	3	4	4	5	5	5	185			
SBE0437	61.4	36.1	70	1	3	10	27	60	64.3	77	14.2	1.39	67.8	13.3	0.32	61.1	4	61.1	4.50	4	3	4	5	5	5	5	180			
MN90138	60.2	38.8	74	2	2	2	7	89	76.4	97	14.1	1.52	67.0	12.6	0.42	61.4	5	61.4	5.50	5	3	6	5	5	5	5	183			
MN91277	61.2	33.2	59	2	1	4	18	77	69.5	51	13.1	1.48	63.8	12.5	0.35	56.5	2	56.5	4.25	2	3	3	4	5	5	5	183			
MN91309	61.4	34.9	52	2	1	8	27	64	64.1	68	14.2	1.56	69.5	13.5	0.32	64.0	5	64.0	5.50	5	3	3	4	5	5	5	185			
MN91324	62.2	32.4	51	2	0	1	11	88	75.6	78	14.3	1.45	69.4	13.2	0.36	63.7	3	63.7	3.50	3	3	4	5	5	5	5	186			
MN92006	63.3	34.3	63	1	4	14	33	49	59.8	64	13.5	1.54	70.3	13.2	0.31	54.6	2	54.6	4.50	2	3	5	5	5	5	5	180			
SBE0050	61.7	31.2	32	3	1	1	7	91	77.7	58	13.0	1.37	66.0	12.3	0.34	59.6	5	59.6	6.50	5	3	3	3	4	4	4	181			
ND673	61.8	35.2	65	1	0	2	11	87	74.0	71	14.5	1.54	70.6	13.8	0.37	61.4	4	61.4	5.00	4	3	3	4	4	4	4	208			
ND674	62.1	33.4	63	2	0	1	12	87	73.6	71	15.2	1.50	68.7	14.8	0.36	62.7	5	62.7	6.00	5	3	3	2	5	5	5	195			
ND677	62.1	32.2	57	2	0	6	25	69	66.2	76	15.0	1.59	67.8	14.0	0.32	60.8	5	60.8	4.25	5	3	3	3	5	5	5	193			

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 3(cont)

FARGO, ND

LOCATION: *Minot, ND*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS DISTRIBUTION			HARD-NESS		WHEAT (14% mb)		FLOUR (%)		FLOUR (14 % mb)		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)					
					A	B	C	D	INDEX	NIR	HARD-NESS		WHEAT (14% mb)		FLOUR (%)										FLOUR (14 % mb)				
											SM	LG	KWT	TW	D										C	G	T	Rating	Rating
ND678	62.6	32.8	48	2	1	3	15	81	71.7	80	15.2	1.54	66.3	14.4	0.33	61.4	3	61.4	3.50	3	5	3	5	198					
ND686	63.1	33.7	68	2	0	0	6	94	75.3	75	14.1	1.43	70.4	13.5	0.33	59.6	3	59.6	5.00	3	3	3	5	188					
N90-0671	60.7	32.5	60	2	0	2	19	79	70.3	77	13.5	1.54	68.8	12.6	0.40	54.6	4	58.7	7.00	6	0	6	5	174					
N90-0666	61.7	34.0	69	1	1	5	20	74	67.1	71	14.2	1.61	70.7	13.4	0.38	61.8	5	61.8	5.25	3	0	5	5	191					
N90-0700	61.6	30.2	38	2	0	1	4	95	79.7	90	14.6	1.42	67.0	13.4	0.34	62.1	5	62.1	5.00	3	3	3	4	193					
N89-0562	61.2	37.0	52	2	1	3	26	70	66.2	71	15.3	1.78	64.9	14.7	0.43	61.8	3	61.8	4.25	3	3	3	5	187					
N89-0059	61.0	38.9	73	2	1	5	20	74	67.1	72	14.1	1.61	68.6	13.2	0.39	60.5	3	60.5	3.50	3	5	5	5	195					
N90-0392	61.9	37.8	77	1	1	8	25	66	64.8	80	14.0	1.54	68.9	13.1	0.36	62.1	3	62.1	4.50	3	3	4	5	190					
N91-3057	60.2	33.6	44	3	1	1	7	91	76.3	60	13.0	1.41	65.2	12.1	0.40	58.6	3	58.6	6.25	3	3	3	5	190					
BW688	61.0	38.6	74	1	2	11	36	51	59.9	68	14.7	1.50	67.6	14.1	0.34	57.3	3	57.3	5.00	3	3	5	5	190					

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:		0		3		6	
		STICKY-WEAK		PLIABLE		ELASTIC	
		YELLOW		GREY		DULL	
		IRREG, THICK		OPEN, THICK		CREAMY	
DOUGH CHAR (DC):		CRUMB COLOR (CC):		CRUMB GRAIN (CG):		CRUMB TEXTURE (CT):	
		BRIGHT WHITE		FINE		SILKY	

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 4

LOCATION: *Prosper, ND*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS			NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating					C T	C G	LOAF VOL (cc)
					A	B	C	D	INDEX	PRO	ASH (14% mb)		EXT (%)	PRO	ASH (14 % mb)	C	C	C						G	T						
Marquis	52.7	23.1	16	8	3	2	16	79	70.7	67	15.7	2.10	62.0	14.9	0.54	58.2	2	58.2	3.25	2	3	3	3	3	3	3	3	3	194		
Chris	52.8	23.1	10	13	1	4	12	83	73.3	71	15.6	1.96	65.2	15.2	0.49	60.5	2	60.5	2.75	2	3	3	3	4	4	4	4	4	4	187	
Era	48.2	22.1	5	22	6	7	15	72	67.7	58	15.7	2.31	63.8	15.0	0.60	59.6	3	59.6	3.50	3	3	3	3	3	3	3	3	3	212		
Stoa	51.0	24.0	7	14	2	2	7	89	78.4	67	16.7	2.10	63.2	16.1	0.50	62.1	3	62.1	3.50	3	4	0	3	3	3	3	3	3	194		
Butte 86	55.2	28.3	30	5	2	3	9	86	74.9	72	15.6	1.93	65.6	14.3	0.45	59.0	3	59.0	3.00	3	3	3	3	4	4	4	4	4	188		
SD0007	51.9	24.4	17	12	2	3	13	82	74.1	68	15.4	2.08	67.5	14.4	0.48	60.8	3	60.8	3.25	3	3	4	4	4	4	4	4	4	190		
SD0010	53.1	24.3	12	12	2	4	7	87	78.4	78	15.7	2.05	67.7	14.2	0.44	59.3	3	59.3	4.00	3	3	3	3	4	4	4	4	4	201		
SD0014	53.0	26.3	19	9	0	4	10	86	74.4	71	15.0	2.03	66.1	13.9	0.45	56.9	2	56.9	4.00	2	3	4	4	4	4	4	4	4	190		
SD3151	55.4	25.3	9	10	1	6	13	80	73.0	55	16.0	2.08	59.2	15.3	0.46	56.2	2	56.2	4.50	2	3	4	3	4	4	4	4	4	202		
SD3156	56.6	27.1	19	9	2	7	12	79	70.4	62	15.1	2.02	62.7	14.1	0.35	59.0	3	59.0	3.50	3	3	3	5	5	5	5	5	5	194		
SBE0437	50.8	23.9	15	15	3	5	9	83	73.5	65	16.1	2.22	63.7	15.1	0.49	61.4	3	61.4	3.50	3	4	4	4	5	5	5	5	5	198		
MN90138	49.9	28.1	33	5	2	4	6	88	80.5	78	15.7	2.35	63.4	14.6	0.65	60.8	3	60.8	3.50	2	3	4	4	5	5	5	5	5	193		
MN91277	50.5	22.7	9	18	4	9	15	72	66.6	33	15.6	2.25	59.5	15.2	0.71	56.5	2	56.5	3.00	2	0	0	3	3	3	3	3	3	190		
MN91309	55.0	28.0	13	9	2	7	16	75	68.1	62	14.6	1.91	65.3	13.3	0.44	60.0	3	60.0	4.00	3	3	4	4	4	4	4	4	4	207		
MN91324	54.1	25.0	9	14	2	2	7	89	79.3	78	16.1	2.09	63.6	15.2	0.51	59.3	2	59.3	3.25	2	3	3	3	4	4	4	4	4	203		
MN92006	55.3	25.6	18	9	3	6	14	77	68.3	65	15.0	1.87	65.5	13.9	0.43	57.6	2	57.6	3.25	2	3	5	4	4	4	4	4	4	190		
SBE0050	51.7	23.0	4	22	2	2	6	90	80.3	65	16.1	2.25	63.1	15.4	0.54	61.8	4	61.8	4.00	3	3	5	4	4	4	4	4	4	231		
ND673	53.8	27.8	21	8	1	4	8	87	76.0	68	16.0	2.08	65.0	15.5	0.46	60.3	3	60.3	4.00	3	3	2	4	4	4	4	4	4	203		
ND674	55.4	25.8	22	7	4	6	9	81	75.9	60	16.9	2.09	64.8	16.2	0.44	63.7	5	63.7	4.00	3	3	3	3	5	5	5	5	5	204		
ND677	52.2	25.2	5	14	7	10	17	66	65.5	47	15.3	2.12	62.7	14.9	0.50	61.1	4	61.1	3.50	2	3	3	3	4	4	4	4	4	196		

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 4(cont)

FARGO, ND

LOCATION: *Prosper, ND*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR EXT (%)	FLOUR (14 % mb)		MIX ABS PAT	BAKE ABS	MIX TIME (min)	D	Rating-----						
					A	B	C	D		INDEX	PRO		ASH (14% mb)	PRO					ASH (14 % mb)	C	C	G	T		
ND678	55.0	25.7	9	14	1	2	11	86	76.3	62	15.9	1.96	63.0	14.8	0.45	61.1	3	61.1	3.00	2	3	4	5	5	191
ND686	53.8	26.1	18	10	1	2	9	88	78.7	70	15.8	1.95	64.0	14.4	0.43	60.8	4	60.8	3.75	2	3	3	4	4	192
N90-0671	52.1	25.3	25	7	1	3	12	84	74.7	62	14.6	2.06	64.7	13.6	0.50	56.5	3	56.5	5.00	2	4	5	5	5	198
N90-0666	52.9	26.9	27	5	2	2	10	86	73.1	67	15.1	2.04	65.5	13.8	0.53	60.3	3	60.3	3.75	2	0	4	5	5	196
N90-0700	51.4	23.3	4	19	2	3	6	89	82.0	72	14.9	1.83	63.0	14.3	0.43	60.3	3	64.2	4.00	3	3	5	5	5	201
N89-0562	51.9	26.4	8	15	2	5	16	77	71.3	57	17.1	2.35	57.8	16.1	0.55	60.0	3	60.0	3.00	3	4	3	5	5	202
N89-0059	43.8	22.7	4	21	11	11	17	61	61.0	50	16.2	2.34	56.5	15.8	0.70	61.1	3	61.1	3.00	1	0	2	3	3	196
N90-0392	49.3	24.7	12	12	1	4	9	86	77.6	60	14.5	2.03	62.7	13.3	0.58	59.3	3	59.3	3.50	2	4	4	4	4	202
N91-3057	47.3	24.7	5	23	6	10	15	69	66.3	58	16.2	2.48	55.9	16.0	0.64	61.4	4	65.4	3.50	2	0	3	4	4	215
BW688	52.0	27.6	32	4	2	4	22	72	67.5	54	15.1	1.84	57.4	13.8	0.49	54.6	1	54.6	4.00	2	3	5	5	5	185
BW173	55.4	26.7	17	7	2	3	10	85	73.7	84	16.8	2.17	66.5	16.1	0.43	62.7	4	62.7	3.50	3	4	5	5	5	192
BW174	55.5	25.3	18	7	1	2	6	91	77.0	79	16.8	1.90	65.7	15.9	0.42	61.1	4	61.1	3.50	3	3	4	5	5	192

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:		0		3		6	
		STICKY-WEAK		PLIABLE		ELASTIC	
		YELLOW		GREY		DULL	
		IRREG, THICK		OPEN, THICK		CREAMY	
DOUGH CHAR (DC):		CRUMB COLOR (CC):		CRUMB GRAIN (CG):		CRUMB TEXTURE (CT):	
		BRIGHT WHITE		FINE		SILKY	

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 5

LOCATION: *Brookings, SD*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating-----				LOAF VOL (cc)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	PRO		ASH (14 % mb)	D C						C G	C T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
					A	B	C	D					INDEX	PRO										ASH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

FARGO, ND																								
LOCATION: Brookings,SD																								
VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS		NIR	WHEAT		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D	C	C	G	T	LOAF VOL (cc)
					A	B	C	DISTRIBUTION			INDEX	HARD- NESS	PRO	ASH (14% mb)										
								PRO	ASH (14 % mb)															
N90-0666	59.0	30.1	56	3	2	8	26	64	64.7	75	15.2	1.91	66.7	13.9	0.43	63.1	5	63.1	3	0	3	6	6	217
N90-0700	57.1	25.1	12	12	2	3	10	85	76.1	75	14.3	1.80	62.5	13.1	0.39	60.3	4	60.3	3	3	4	5	5	198
N89-0562	57.3	29.7	25	6	2	7	20	71	66.7	60	15.8	2.21	57.6	14.7	0.50	60.3	4	60.3	3	3	3	5	5	203
N89-0059	56.2	29.7	37	5	0	5	28	67	66.1	62	14.4	1.97	60.9	12.8	0.44	60.3	4	60.3	3	3	4	5	5	217
N90-0392	55.9	31.5	51	4	2	5	19	74	67.5	75	14.3	1.88	64.1	12.5	0.45	60.8	4	60.8	3	3	5	6	6	202
N91-3057	54.6	29.8	21	8	4	5	18	73	66.6	59	14.2	2.06	60.3	13.4	0.50	62.7	5	62.7	3	3	4	6	6	205
BW688	56.4	32.7	52	3	2	9	31	58	66.3	63	15.7	1.86	62.9	14.6	0.41	62.7	6	62.7	3	4	4	6	6	208
BW173	60.6	29.4	40	3	6	8	32	54	61.9	60	14.6	1.84	65.0	13.4	0.37	63.7	3	63.7	3	3	5	6	6	198
BW174	60.5	29.7	42	3	3	11	34	52	61.8	57	14.7	1.80	66.2	13.6	0.37	63.4	3	63.4	3	3	5	6	6	200

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):

CRUMB COLOR (CC):

CRUMB GRAIN (CG):

CRUMB TEXTURE (CT):

0

STICKY-WEAK

YELLOW

IRREG, THICK

HARSH

3

PLIABLE

GREY

OPEN, THICK

COARSE

ELASTIC

CREAMY

BRIGHT WHITE

FINE

SILKY

6

BUCKY

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 6

LOCATION: *Groton, SD* FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		MIX		BAKE ABS	MIX TIME (min)	D	Rating-----				LOAF VOL (cc)	
					A	B	C	D	INDEX	HARD- NESS	PRO	ASH (14%mb)	EXT (%)	PRO	ASH (14 % mb)	ABS				PAT	C	C	G		T
Marquis	59.4	26.7	32	3	1	1	9	89	74.4	78	14.3	1.87	65.1	13.3	0.44	59.0	3	59.0	4.00	3	3	3	4	188	
Chris	60.3	29.7	42	3	0	8	20	72	66.0	70	15.1	1.91	63.9	14.5	0.42	60.8	3	60.8	3.50	3	3	3	4	194	
Era	59.7	28.1	27	5	0	3	7	90	76.0	62	13.2	1.87	64.5	12.1	0.43	56.5	2	56.5	5.50	3	3	5	5	206	
Stoa	60.9	32.3	53	2	1	1	11	87	74.0	66	14.5	1.78	63.8	13.5	0.38	58.6	4	58.6	5.00	3	3	5	5	190	
Butte 86	63.2	38.1	79	1	1	2	17	80	68.5	82	14.3	1.73	65.9	12.7	0.37	59.0	2	59.0	3.00	3	3	2	5	179	
SD0007	61.1	35.3	73	1	2	9	30	59	61.9	68	14.3	1.80	67.3	13.2	0.38	59.3	3	59.3	4.00	3	3	3	4	192	
SD0010	63.3	33.7	66	1	1	2	17	80	68.0	72	13.4	1.72	69.9	12.1	0.35	58.2	4	58.2	5.00	2	5	4	2	178	
SD0014	60.9	35.0	69	1	2	8	27	63	63.5	72	14.1	1.76	67.9	12.7	0.39	57.6	3	57.6	4.25	3	3	3	4	187	
SD3151	62.4	33.9	50	1	1	3	16	80	68.2	66	14.9	1.77	61.0	14.0	0.43	56.2	2	56.2	5.25	2	4	4	5	179	
SD3156	64.2	36.6	72	1	1	7	25	67	63.4	61	15.0	1.74	65.5	12.3	0.35	56.5	5	56.5	4.00	2	3	4	4	173	
SBE0437	61.7	36.1	73	1	1	5	24	70	65.0	75	14.1	1.76	68.2	12.8	0.38	59.0	3	59.0	3.75	3	3	3	4	192	
MN90138	61.0	45.1	86	1	1	2	13	84	70.3	92	15.0	1.93	64.7	13.1	0.50	59.3	3	59.3	4.00	3	5	5	5	192	
MN91277	61.0	34.9	63	2	1	6	22	71	67.2	54	13.6	1.83													
MN91309	62.4	34.9	50	1	2	6	30	62	64.1	76	14.2	1.68	66.9	13.0	0.40	58.2	3	58.2	5.00	2	3	5	5	178	
MN91324	62.7	33.9	59	2	1	2	13	84	70.8	83	14.1	1.84	66.9	13.0	0.42	59.6	3	59.6	4.00	3	5	3	4	181	
MN92006	63.4	39.2	80	1	5	18	41	36	54.2	62	14.3	1.72	67.6	13.5	0.35	56.5	2	56.5	3.50	2	5	3	3	175	
SBE0050	61.8	34.0	45	3	1	4	12	83	70.8	48	14.2	1.85	66.7	13.4	0.41	60.8	5	60.8	5.00	3	4	3	5	187	
ND673	63.3	37.7	74	1	1	2	14	83	70.1	85	14.4	1.65	69.1	13.5	0.39	61.8	5	61.8	4.50	3	3	3	4	194	
ND674	63.4	35.0	77	1	2	4	19	75	68.1	77	15.6	1.75	68.9	15.1	0.41	62.7	6	62.7	4.25	3	4	4	5	198	
ND677	63.0	35.3	67	1	3	15	31	51	59.5	61	14.3	1.78	68.7	13.9	0.41	60.3	4	60.3	4.25	3	3	3	4	193	

LOCATION: *Groton,SD*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C C	C G	C T	C VOL	LOAF VOL (cc)
					A	B	C	D	INDEX	PRO	ASH (14% mb)	EXT (%)		PRO	ASH (14 % mb)															
ND678	63.2	32.1	46	2	0	1	14	85	73.0	73	14.9	1.80	68.4	13.6	0.38	60.5	4	60.5	4.00	3	3	4	3	4	5	5	192			
ND686	64.1	35.5	73	1	0	1	15	84	69.1	74	14.1	1.68	70.2	12.9	0.36	60.8	5	60.8	4.75	3	3	4	3	4	5	5	191			
N90-0671	60.6	35.5	74	1	0	2	16	82	70.3	72	13.8	1.78	68.9	12.5	0.43	59.3	4	59.3	5.50	3	3	4	3	4	5	5	176			
N90-0666	62.2	38.5	80	1	1	11	33	55	59.9	77	14.8	1.85	69.8	14.1	0.41	60.8	4	60.8	4.50	3	3	2	3	2	4	4	192			
N90-0700	62.4	32.1	48	2	0	2	7	91	73.1	81	14.2	1.66	67.7	13.0	0.37	60.0	3	60.0	4.50	3	3	3	3	3	4	4	195			
N89-0562	61.3	35.5	47	2	1	5	19	75	66.8	68	15.3	2.09	63.7	14.5	0.48	59.0	3	59.0	4.50	3	4	4	3	4	4	4	187			
N89-0059	60.9	39.9	76	1	1	9	27	63	62.9	68	14.5	1.81	66.6	13.3	0.42	58.2	2	58.2	3.50	3	5	3	3	5	3	4	191			
N90-0392	61.9	40.4	82	1	2	2	16	80	68.6	88	13.7	1.75	67.7	12.4	0.40	62.7	5	62.7	4.50	3	3	3	3	3	4	4	190			
N91-3057	60.7	36.8	49	2	1	4	20	75	68.4	65	13.8	1.86	65.7	12.6	0.45	62.1	5	62.1	6.00	2	3	3	3	3	5	5	197			
BW688	59.0	37.4	66	2	3	10	36	51	59.7	74	15.6	1.81	65.4	14.8	0.42	61.4	4	61.4	4.00	3	4	2	3	4	2	5	200			

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:		0						3		6					
		DOUGH CHAR (DC):						STICKY-WEAK		PLIABLE		ELASTIC		BUCKY	
CRUMB COLOR (CC):		YELLOW						GREY		DULL		CREAMY		BRIGHT WHITE	
CRUMB GRAIN (CG):		IRREG, THICK								OPEN, THICK		FINE			
CRUMB TEXTURE (CT):		HARSH								COARSE		SILKY			

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 7

LOCATION: *Madison, WI*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating				LOAF VOL (cc)		
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	FLOUR		ABS	PAT						ABS	TIME (min)	C C	C G		C T	
					A	B	C	D					INDEX	PRO														ASH (14 % mb)
Marquis	57.7	29.6	45	5	2	8	26	64	68.1	59	15.3	2.04	64.0	14.3	0.48	60.5	3	60.5	4.00	3	4	4	4	4	198			
Chris	60.8	30.0	48	3	2	9	19	70	70.9	64	15.9	1.85	66.5	14.3	0.41	59.0	3	59.0	4.00	3	5	5	4	4	190			
Era	58.6	28.2	36	6	1	6	20	73	71.6	56	14.6	1.90	64.4	12.7	0.42	55.5	2	55.5	5.00	3	4	5	4	4	192			
Stoa	57.7	29.3	36	5	2	5	15	78	71.7	60	15.5	1.96	64.9	14.0	0.42	59.3	4	59.3	5.00	3	4	5	5	5	214			
Butte 86	59.5	32.5	59	2	2	3	18	77	73.8	63	15.2	1.87	64.0	13.4	0.38	57.3	3	57.3	4.25	3	4	4	4	4	186			
SD0007	59.1	31.6	58	1	1	6	27	66	70.3	58	14.7	1.82	68.4	13.2	0.38	57.9	2	57.9	3.00	2	4	6	5	5	208			
SD0010	60.9	30.9	48	3	1	3	17	79	76.6	62	15.3	1.84	68.7	13.6	0.35	59.0	4	59.0	5.00	3	4	3	5	5	202			
SD0014	60.3	32.8	59	2	2	6	25	67	69.8	62	14.9	1.84	68.5	12.8	0.35	57.9	3	57.9	5.00	2	4	4	4	5	188			
SD3151	59.4	30.9	32	3	1	3	14	82	85.1	55	16.2	1.94	61.2	14.6	0.45	57.6	3	61.5	4.25	3	5	3	5	5	217			
SD3156	61.2	32.8	52	2	3	5	23	69	70.1	52	14.2	1.88	64.3	11.6	0.36	55.8	3	55.8	5.00	2	4	6	5	5	179			
SBE0437	58.4	31.5	52	2	1	5	24	70	71.4	62	14.1	1.82	67.2	12.3	0.37	57.9	2	57.9	3.50	3	4	5	5	5	192			
MN90138	58.7	37.6	73	1	1	6	20	73	71.5	76	16.2	2.08	61.1	13.5	0.55	59.3	2	59.3	4.00	2	5	5	5	5	195			
MN91277	59.3	31.6	55	3	4	12	34	50	64.2	47	14.8	1.99	62.9	13.2	0.46	55.3	1	55.3	3.25	3	4	5	5	5	185			
MN91309	59.6	31.0	29	2	2	4	17	77	75.3	59	15.1	1.88	65.8	13.0	0.42	57.6	4	57.6	5.25	3	4	5	4	4	185			
MN91324	60.0	31.9	46	3	2	5	18	75	75.1	67	15.0	1.95	65.3	13.2	0.48	59.0	3	59.0	4.00	3	4	3	5	5	202			
MN92006	61.3	33.8	63	2	5	22	33	40	57.6	55	14.5	1.74	67.5	13.1	0.38	55.3	3	55.3	3.50	3	5	5	4	4	187			
SBE0050	58.2	29.8	32	4	3	5	20	72	70.6	58	14.9	1.94	64.8	13.6	0.44	58.2	3	58.2	4.00	3	4	3	5	5	225			
ND673	61.1	33.5	61	2	0	4	19	77	70.7	59	14.6	1.83	65.7	12.4	0.38	55.8	4	55.8	6.50	3	4	3	4	4	194			
ND674	61.7	33.3	67	2	0	8	23	69	76.0	69	15.5	1.92	67.2	14.5	0.42	57.9	5	57.9	5.50	3	4	4	4	5	210			
ND677	59.0	31.7	53	3	3	14	24	59	66.7	49	15.1	1.89	64.4	13.5	0.40	57.3	4	57.3	4.25	3	4	4	4	5	215			

Table 7(cont)

FARGO, ND											Table 7/(cont)													
VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARD- NESS	WHEAT		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)		
					DISTRIBUTION		INDEX	PRO		ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)											
					A	B																	C	D
ND678	61.2	30.5	42	4	2	4	15	79	74.6	70	15.6	1.90	64.9	13.5	0.41	59.0	3	59.0	3	5	3	5	207	
ND686	62.1	34.6	62	1	1	12	28	59	67.5	55	14.4	1.76	67.7	12.6	0.39	55.3	3	55.3	2	4	5	4	177	
N90-0671	58.8	31.6	62	2	1	8	24	67	66.1	64	14.5	1.91	64.7	12.7	0.46	54.6	3	54.6	2	0	5	5	184	
N90-0666	59.4	34.8	71	1	2	9	32	57	63.3	62	15.6	1.92	65.1	13.7	0.45	59.6	4	59.6	4.00	3	0	3	5	193
N90-0700	60.6	29.8	37	3	0	3	12	85	78.9	73	15.1	1.78	65.6	13.0	0.39	59.0	5	59.0	5.00	3	4	4	5	193
N89-0562	59.1	33.0	32	3	1	10	22	67	72.9	56	16.1	2.31	61.9	15.0	0.54	59.0	4	59.0	4.50	3	4	4	5	201
N89-0059	59.4	35.4	68	2	1	13	36	50	60.8	56	14.8	1.94	63.8	13.3	0.45	58.6	2	58.6	3.00	3	4	4	5	207
N90-0392	59.5	36.9	74	1	3	9	31	57	63.2	65	13.8	1.77	65.4	11.7	0.47	57.6	4	61.5	4.25	3	4	3	4	201
N91-3057	58.5	33.2	46	4	3	9	27	61	63.8	57	14.0	1.99	61.2	12.4	0.48	56.2	4	56.2	7.00	2	3	4	5	182
BW688	59.2	35.1	67	2	2	13	34	51	64.5	59	15.0	1.83	64.9	13.4	0.41	55.5	2	55.5	4.50	2	3	6	5	202
BW173	57.1	28.7	18	10	2	5	17	76	73.3	63	16.5	1.99	63.4	15.4	0.43	60.5	5	60.5	4.00	3	0	3	5	208
BW174	58.4	29.2	27	6	2	4	17	77	77.0	68	17.2	1.99	65.1	15.9	0.44	60.8	4	60.8	4.00	3	0	3	5	203

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):
CRUMB COLOR (CC):
CRUMB GRAIN (CG):
CRUMB TEXTURE (CT):

0

STICKY-WEAK
YELLOW
IRREG, THICK
HARSH

3

ELASTIC
DULL
OPEN, THICK
COARSE

6

BUCKY
BRIGHT WHITE
FINE
SILKY

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 8

LOCATION: Morris, MN FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	FLOUR		FLOUR										
					A	B	C	D					INDEX	PRO	ASH (14% mb)										
																ASH (14% mb)									
Marquis	57.0	27.9	43	4	2	7	18	73	67.6	60	15.4	1.86	62.4	15.0	0.45	57.6	3	57.6	4.50	3	3	3	5	5	199
Chris	57.5	26.0	34	8	4	4	16	76	69.8	62	14.8	1.77	63.9	14.7	0.41	59.0	3	59.0	3.50	3	3	3	4	6	209
Era	54.3	23.7	12	15	3	5	11	81	73.9	53	14.7	1.94	63.3	14.1	0.45	57.3	4	57.3	5.50	3	3	3	4	6	217
Stoa	56.3	27.1	32	7	2	3	6	89	77.1	58	15.0	1.89	63.6	14.6	0.43	60.5	4	60.5	5.00	3	4	3	5	5	232
Butte 86	59.0	30.6	47	4	0	1	7	92	77.2	78	15.1	1.74	64.5	14.4	0.39	59.6	3	59.6	4.00	3	3	3	3	6	198
SD0007	57.5	28.0	46	5	0	3	12	85	72.0	63	14.6	1.89	66.1	13.9	0.41	58.2	3	58.2	4.00	3	3	3	3	5	224
SD0010	58.7	27.3	30	6	1	2	6	91	78.8	76	14.7	1.59	67.4	13.8	0.35	58.6	4	58.6	5.50	3	3	3	4	5	188
SD0014	56.0	27.5	43	5	1	2	10	87	75.7	68	14.5	1.73	64.8	13.7	0.39	60.0	5	60.0	5.25	3	3	3	3	6	212
SD3151	57.0	27.7	14	8	1	1	8	90	75.5	56	16.1	1.90	58.8	15.8	0.44	56.5	4	56.5	6.00	3	3	3	4	6	202
SD3156	58.4	27.5	29	8	3	4	17	76	69.3	57	14.8	1.78	61.2	14.2	0.38	60.0	4	60.0	4.50	3	4	4	5	6	207
SBE0437	56.4	28.3	50	4	1	5	11	83	72.7	63	14.5	1.93	65.8	13.8	0.42	59.0	3	59.0	4.50	3	4	4	5	6	213
MN90138	52.6	32.0	47	5	1	2	8	89	76.2	79	15.8	2.09	59.5	14.6	0.56	59.3	3	59.3	4.75	3	3	3	4	6	218
MN91277	55.8	28.6	34	8	4	8	16	72	65.9	45	14.5	2.00	58.2	13.9	0.47	54.6	1	54.6	3.75	3	0	4	4	5	220
MN91309	58.6	31.1	35	6	2	7	27	64	64.6	70	14.7	1.76	64.3	13.9	0.41	58.2	3	58.2	5.00	3	3	3	3	5	203
MN91324	58.6	28.0	32	8	3	2	7	88	76.6	74	15.4	1.75	64.5	14.7	0.44	59.6	3	59.6	4.00	3	4	3	3	5	222
MN92006	59.1	29.7	46	5	3	17	34	46	59.2	58	14.6	1.74	64.4	13.9	0.39	55.5	2	55.5	4.00	3	3	3	3	5	204
SBE0050	57.2	27.6	21	12	2	3	14	81	72.0	52	14.2	1.76	62.5	13.5	0.43	59.3	5	63.0	6.00	3	4	5	5	5	203
ND673	58.8	31.7	52	4	2	3	10	85	72.8	65	15.1	1.76	64.6	14.5	0.42	60.8	5	60.8	5.00	3	3	5	5	5	217
ND674	59.8	28.4	49	4	1	4	14	81	69.0	66	16.1	1.85	65.4	15.7	0.40	60.3	5	60.3	5.50	3	4	3	6	6	216
ND677	56.2	27.5	23	10	6	11	22	61	62.3	55	14.8	1.95	62.0	14.6	0.49	60.0	3	60.0	4.00	3	0	5	5	5	231

FARGO, ND

LOCATION: *Morris, MN*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS			NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	C VOL (cc)
					A	B	C	D	INDEX	PRO	ASH (14% mb)		EXT (%)	FLOUR													
														PRO	ASH (14 % mb)												
																PRO	ASH (14 % mb)										
ND678	58.9	27.5	29	9	2	2	2	6	90	77.3	72	15.3	1.83	62.2	14.3	0.45	60.0	3	60.0	4.00	3	4	3	5	5	221	
ND686	60.3	29.1	50	4	1	2	6	91	76.2	67	67	14.4	1.63	65.4	13.9	0.36	59.3	4	59.3	5.50	3	4	4	5	5	197	
N90-0671	57.4	30.5	62	3	1	2	13	84	71.6	67	67	14.4	1.85	65.3	13.5	0.44	60.0	5	60.0	5.50	3	0	5	5	5	202	
N90-0666	57.8	32.0	66	2	1	7	23	69	65.7	72	72	14.9	1.84	66.3	14.4	0.44	60.8	5	60.8	5.00	3	0	4	5	5	212	
N90-0700	57.9	25.4	25	9	1	2	6	91	77.4	72	72	15.0	1.67	64.4	13.8	0.40	60.3	4	60.3	5.00	3	4	2	5	5	223	
N89-0562	55.9	28.8	24	10	1	6	15	78	70.2	65	65	16.3	2.27	56.3	15.9	0.51	59.3	3	59.3	4.00	3	4	3	5	5	204	
N89-0059	54.5	30.2	44	5	1	5	20	74	67.6	52	52	15.1	1.90	60.2	14.3	0.47	58.2	2	58.2	3.50	3	4	4	5	5	216	
N90-0392	55.0	30.0	49	5	2	3	12	83	71.3	60	60	14.3	1.81	63.3	13.5	0.48	59.0	3	59.0	4.50	3	4	4	5	5	230	
N91-3057	50.5	24.6	7	18	2	6	15	77	72.1	49	49	15.8	2.11	54.2	15.4	0.55	61.4	5	61.4	5.25	3	4	4	5	5	236	
BW688	55.5	30.7	49	5	3	6	19	72	67.4	55	55	14.9	1.85	63.7	14.4	0.46	55.0	2	55.0	5.00	3	4	3	5	5	212	
BW173	56.3	28.2	31	8	1	5	15	79	70.9	68	68	16.1	1.97	64.9	15.8	0.42	58.2	4	58.2	5.00	3	4	4	5	5	198	
BW174	56.6	28.2	29	9	2	3	13	82	71.4	80	80	16.1	1.95	64.0	15.8	0.45	58.2	4	58.2	5.00	3	4	3	4	5	198	

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):

CRUMB COLOR (CC):

CRUMB GRAIN (CG):

CRUMB TEXTURE (CT):

STICKY-WEAK

YELLOW

IRREG, THICK

HARSH

PLIABLE

GREY

OPEN, THICK

COARSE

ELASTIC

DULL

CREAMY

BRIGHT WHITE

FINE

SILKY

0 3 6

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 9

LOCATION: St. Paul, MN

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	BAKE ABS	MIX TIME (min)	D C	Rating				LOAF VOL (cc)		
					DISTRIBUTION					PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	MIX PAT					C G	C T	C G	C T			
					A	B	C	D																	INDEX	
Marquis	58.2	29.0	42	2	4	8	34	54	60.8	59	15.0	2.08	61.4	14.4	0.51	56.9	3	56.9	4.00	3	3	3	3	5	5	187
Chris	58.5	26.8	26	7	2	7	28	63	65.6	75	15.6	2.14	63.8	15.3	0.62	57.3	3	57.3	4.00	3	3	3	3	5	5	194
Era	59.0	28.1	29	7	2	5	17	76	68.7	69	13.8	2.00	65.7	12.5	0.47	52.2	2	56.2	5.75	3	3	3	3	5	5	180
Stoa	58.2	27.9	22	6	0	3	9	88	73.3	77	15.1	2.04	63.9	14.2	0.43	60.8	5	60.8	5.50	3	3	3	3	5	5	197
Butte 86	60.1	31.5	41	2	1	3	17	79	69.4	73	15.0	2.00	65.0	13.3	0.44	60.5	3	60.5	4.50	3	3	3	3	4	5	181
SD0007	58.6	29.6	50	3	1	6	24	69	66.1	68	14.1	1.92	67.6	12.8	0.47	59.3	3	59.3	4.25	3	3	3	3	4	4	193
SD0010	56.9	25.6	19	7	2	3	17	78	69.4	72	14.1	1.94	67.6	12.8	0.43	59.6	7	59.6	7.00	6	5	4	4	4	4	173
SD0014	57.8	30.2	39	4	2	6	28	64	64.5	69	14.1	2.05	65.8	12.9	0.41	59.3	4	59.3	5.75	6	3	3	3	4	4	177
SD3151	58.6	26.8	8	7	4	6	14	76	69.2	58	15.0	2.05	61.6	13.9	0.49	56.9	2	56.9	6.25	6	4	3	3	5	5	167
SD3156	60.5	28.4	19	7	1	9	14	76	62.7	54	14.2	2.12	63.1	13.0	0.39	57.6	4	57.6	6.00	6	3	3	5	5	5	175
SBE0437	59.0	30.1	51	3	2	5	27	66	64.8	67	14.3	2.00	68.0	13.1	0.42	59.3	3	59.3	4.00	3	5	4	4	5	5	192
MN90138	58.6	33.0	53	3	3	2	10	85	73.9	85	14.7	2.17	62.7	13.1	0.63	57.6	3	57.6	6.00	6	5	4	5	4	5	174
MN91277	58.5	29.1	34	5	3	8	24	65	64.3	39	14.3	2.24	59.1	13.5	0.53	53.8	1	53.8	4.50	6	3	4	4	5	5	175
MN91309	58.3	28.6	19	8	2	10	24	64	65.2	64	14.2	1.96	64.3	12.9	0.51	57.6	4	57.6	6.50	3	3	3	3	3	5	178
MN91324	58.3	26.1	12	12	2	2	9	87	76.0	83	14.9	2.05	64.1	13.7	0.52	60.3	5	60.3	5.50	3	3	3	5	5	5	192
MN92006	57.7	26.7	19	6	5	10	28	57	61.0	57	14.4	2.04	64.9	13.7	0.44	55.0	2	55.0	5.00	3	3	3	4	5	5	186
SBE0050	57.8	27.5	12	12	1	4	8	87	74.9	67	14.3	2.11	61.4	13.4	0.55	58.2	5	62.2	6.50	3	3	4	4	5	5	188
ND673	58.4				2	3	15	80	71.0	62	14.9	2.06		14.2	0.47	59.0	5	59.0	7.00	3	3	3	3	5	5	192
ND674	60.8	28.5	38	4	2	3	7	88	73.3	68	15.3	2.03	65.7	14.4	0.49	59.3	5	59.3	7.00	3	0	4	4	5	5	194
ND677	59.4	27.1	20	6	4	10	21	65	63.9	63	15.4	2.09	64.2	14.6	0.43	60.5	5	60.5	6.00	3	3	4	4	5	5	190

**USDA / ARS
WHEAT QUALITY LAB**

FARGO, ND

Table 9(cont)

DISTRIBUTION: A = % Soft

B= % Semi-Soft
C= % Semi-Hard
D= % Hard

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 10

FARGO, ND

LOCATION: Selby, SD

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating				LOAF VOL (cc)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	PRO		ASH (14 % mb)	C						C	C	G	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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FARGO, ND

LOCATION: *Selby,SD*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS		NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D	Rating-----				LOAF VOL (cc)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
					A	B	C	D	INDEX		PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	C						C	C	G	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:		0						3			6		
		DOUGH CHAR (DC):		STICKY-WEAK		PLIABLE		ELASTIC		BUCKY			
		CRUMB COLOR (CC):		YELLOW		GREY		DULL		BRIGHT WHITE			
		CRUMB GRAIN (CG):		IRREG, THICK		OPEN, THICK		COARSE		FINE		SILKY	
CRUMB TEXTURE (CT):				HARSH									

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 11

LOCATION: Dickinson, ND

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating					LOAF VOL (cc)
					A	B	C	D		INDEX	PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)						C	C	G	T		
Marquis	62.2	28.5	38	6	0	3	14	83	76.8	67	12.7	1.42	68.0	11.4	0.35	56.2	2	56.2	4.00	2	3	5	4	4	166	
Chris	61.8	27.2	27	3	1	3	13	83	75.5	67	14.1	1.34	69.3	13.2	0.32	59.0	3	59.0	3.50	3	3	5	5	5	182	
Era	61.0	27.8	24	4	0	1	9	90	78.4	63	13.1	1.48	70.3	11.8	0.40	56.5	3	56.5	5.00	3	4	3	4	4	185	
Stoa	61.4	29.2	36	3	1	1	9	89	76.1	58	13.6	1.40	69.8	12.5	0.37	60.3	3	60.3	4.50	3	3	6	6	6	195	
Butte 86	61.4	30.6	41	3	0	3	13	84	78.4	65	13.6	1.41	68.2	12.1	0.37	59.3	3	59.3	4.00	3	4	3	5	5	182	
SD0007	61.8	30.8	51	1	1	5	21	73	70.7	59	13.7	1.27	71.5	12.5	0.34	59.6	3	59.6	4.50	3	3	5	5	5	197	
SD0010	62.9	30.8	47	1	0	1	14	85	75.2	73	13.7	1.38	70.6	12.7	0.33	60.5	3	60.5	4.50	3	3	4	5	5	180	
SD0014	61.6	31.8	47	1	1	4	28	67	67.0	64	14.0	1.30	70.7	12.7	0.31	60.0	3	60.0	4.25	3	4	5	6	6	188	
SD3151	62.1	30.7	36	2	0	1	17	82	73.3	74	15.6	1.44	66.4	15.0	0.40	58.2	3	58.2	4.50	3	0	4	5	5	198	
SD3156	63.8	32.1	55	1	0	4	22	74	68.4	59	13.9	1.39	67.7	12.8	0.31	59.6	3	59.6	4.00	3	3	3	5	5	183	
SBE0437	61.3	30.4	43	2	1	2	14	83	76.9	63	13.0	1.44	69.7	11.7	0.35	57.9	3	57.9	4.50	3	4	5	5	5	189	
MN90138	61.0	34.4	58	2	1	2	15	82	75.4	77	14.2	1.52	67.7	12.4	0.44	59.0	3	59.0	5.50	2	5	4	5	5	185	
MN91277	61.8	31.7	43	1	2	5	23	70	66.9	54	12.9	1.39	65.5	12.3	0.36	55.8	2	55.8	4.25	2	4	5	4	4	172	
MN91309	62.1	32.3	34	2	2	7	23	68	70.1	61	14.8	1.38	68.0	13.6	0.35	60.8	3	60.8	4.50	3	3	4	5	5	187	
MN91324	63.2	29.2	37	2	1	1	11	87	81.5	77	14.7	1.37	69.7	13.5	0.36	61.1	3	61.1	3.50	3	4	5	5	5	205	
MN92006	63.8	31.8	55	1	3	11	31	55	63.2	59	13.4	1.48	69.6	12.3	0.33	57.6	2	57.6	3.50	2	3	5	4	4	182	
SBE0050	62.2	29.4	18	3	1	2	9	88	75.0	58	12.9	1.39	66.6	11.9	0.36	59.0	4	59.0	6.00	2	5	4	5	5	181	
ND673	62.8	32.7	53	2	2	3	14	81	71.5	66	14.1	1.36	69.2	13.0	0.33	60.0	3	60.0	5.00	3	4	4	5	5	195	
ND674	62.0	27.9	44	2	0	2	9	89	83.3	69	14.7	1.55	67.1	14.2	0.36	60.0	5	60.0	5.75	3	0	3	5	5	206	
ND677	62.9	33.4	53	1	1	8	29	62	64.5	62	13.6	1.47	68.2	12.7	0.34	59.0	3	59.0	4.50	3	3	3	5	5	198	

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 11(cont)

FARGO, ND															Table 11(cont)									
VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS		NIR HARD- NESS	WHEAT		FLOUR		FLOUR EXT (%)	MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C G	C T	LOAF VOL (cc)
					A	B	C	D	DISTRIBUTION			PRO	ASH (14% mb)	PRO	ASH (14 % mb)									
									INDEX															
ND678	62.9	29.9	32	2	0	1	15	84	72.3	66	14.6	1.29	66.3	13.4	0.32	60.8	3	60.8	4.00	3	5	2	5	197
ND686	64.3	31.8	58	1	1	3	14	82	70.4	59	13.6	1.34	67.3	12.3	0.32	57.6	2	57.6	4.50	3	3	3	5	184
N90-0671	61.2	29.7	46	2	0	2	11	87	73.2	66	13.0	1.42	67.3	11.5	0.37	54.3	2	54.3	8.25	6	0	6	2	150
N90-0666	61.8	30.3	44	2	1	9	26	64	69.1	62	14.4	1.50	68.5	13.5	0.38	60.0	4	60.0	5.00	3	0	3	5	197
N90-0700	62.6	28.5	25	2	0	2	4	94	81.6	76	14.7	1.48	66.7	13.6	0.36	60.0	3	60.0	3.50	3	4	3	5	201
N89-0562	61.6	34.5	39	2	1	7	26	66	67.0	63	15.2	1.59	66.2	14.9	0.42	58.2	3	58.2	4.25	3	4	3	4	183
N89-0059	61.5	35.4	65	1	2	6	30	62	63.9	64	14.3	1.46	67.1	13.2	0.37	60.0	3	60.0	3.25	3	3	3	5	220
N90-0392	63.1	36.9	76	1	3	15	32	50	63.1	72	13.8	1.49	68.5	12.5	0.35	60.8	3	60.8	4.00	3	3	6	5	190
N91-3057	60.4	32.6	37	2	0	3	13	84	70.4	59	12.7	1.35	65.8	11.7	0.37	59.3	4	59.3	5.50	3	5	5	5	181
BW688	60.9	33.6	57	1	1	10	26	63	70.6	62	14.3	1.35	68.2	13.2	0.34	56.5	2	56.5	4.00	3	0	5	5	195
BW173	60.8	28.4	18	4	1	2	14	83	75.8	69	14.6	1.38	69.2	13.7	0.32	57.6	3	57.6	5.00	2	4	5	4	178
BW174	61.2	28.3	22	4	0	2	10	88	77.1	61	13.5	1.47	68.7	12.4	0.36	57.6	3	57.6	5.00	2	3	3	3	174

DISTRIBUTION: A= % Soft		RATINGS:												0			3			6		
		B= % Semi-Soft			DOUGH CHAR (DC):			STICKY-WEAK			PLIABLE			ELASTIC			BUCKY					
D= % Hard		C= % Semi-Hard			CRUMB COLOR (CC):			YELLOW			GREY			DULL			CREAMY			BRIGHT WHITE		
					CRUMB GRAIN (CG):			IRREG, THICK						OPEN, THICK			FINE					
					CRUMB TEXTURE (CT):			HARSH						COARSE			SILKY					

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 12

LOCATION: *Powell, WY*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS			NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating						LOAF VOL (cc)
					DISTRIBUTION				PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	C						C	C	G	T			
					A	B	C																	D	INDEX	
Marquis	62.4	36.3	75	1	2	15	40	43	57.8	77	13.5	1.78	65.9	12.6	0.40	59.0	2	59.0	2.50	2	3	4	4	4	173	
Chris	62.6	34.6	73	1	2	7	25	66	62.6	82	12.6	1.71	66.5	11.5	0.38	57.6	2	57.6	2.50	1	3	3	3	3	165	
Era	63.1	36.5	77	1	2	7	30	61	63.1	77	10.9	1.59	66.6	9.2	0.39	52.9	1	52.9	4.50	1	4	2	0	0	144	
Stoa	63.1	37.1	75	1	0	3	20	77	69.3	86	12.1	1.71	66.6	10.4	0.36	55.5	1	55.5	4.00	1	4	5	3	3	157	
Butte 86	63.6	39.9	87	1	2	9	29	60	61.8	77	12.9	1.71	65.8	11.2	0.36	57.3	1	57.3	3.00	1	4	3	3	3	142	
SD0007	63.7	38.1	84	1	0	5	33	62	62.7	74	11.5	1.64	68.7	9.9	0.35	55.8	1	55.8	4.00	1	4	3	3	3	161	
SD0010	63.3	38.2	79	1	2	10	38	50	59.3	76	12.8	1.62	70.9	11.2	0.34	57.6	2	61.4	4.00	1	4	5	3	3	159	
SD0014	63.2	39.7	82	1	1	7	36	56	61.9	78	12.3	1.67	68.8	10.8	0.34	55.8	1	59.4	4.00	1	4	5	3	3	152	
SD3151	62.6	37.3	72	1	1	8	29	62	63.9	67	14.1	1.75	63.8	13.5	0.42	57.3	1	57.3	4.25	1	4	3	4	4	162	
SD3156	64.5	37.7	80	2	2	11	30	57	61.7	73	12.6	1.78	67.0	11.2	0.34	56.2	1	56.2	3.50	1	4	2	3	3	156	
SBE0437	63.7	39.3	82	1	0	5	22	73	66.3	74	12.4	1.68	66.6	10.8	0.37	55.3	1	55.3	4.00	1	4	3	3	3	149	
MN90138	63.1	46.6	90	1	2	4	23	71	64.9	81	12.8	1.80	64.5	11.1	0.46	55.3	2	59.0	3.75	1	3	2	2	2	145	
MN91277	63.8	40.1	85	1	4	16	33	47	57.5	62	11.9	1.69	66.6	10.8	0.40	52.2	1	56.2	3.25	1	4	2	3	3	150	
MN91309	63.7	40.3	74	1	6	18	45	31	54.7	67	13.0	1.66	67.8	11.4	0.36	57.9	3	57.9	4.50	1	3	3	4	4	155	
MN91324	63.8	37.7	78	1	1	9	34	56	62.0	78	12.9	1.66	68.3	11.8	0.39	59.6	2	59.6	2.50	2	3	4	4	4	170	
MN92006	64.5	40.7	85	1	8	18	38	36	54.2	78	13.0	1.67	68.9	12.1	0.33	56.5	4	56.5	3.50	2	3	4	4	4	165	
SBE0050	63.7	39.0	75	1	1	8	29	62	62.7	74	11.9	1.68	66.3	10.8	0.41	57.3	2	57.3	4.00	2	3	3	5	5	172	
ND673	64.2	38.7	78	1	2	8	27	63	62.6	66	12.5	1.73	67.2	11.2	0.35	57.3	2	61.0	3.50	2	3	3	5	5	179	
ND674	64.5	36.0	77	1	1	5	22	72	66.5	78	14.0	1.71	67.1	13.2	0.38	59.3	3	63.0	4.00	3	4	3	5	5	182	
ND677	63.3	37.3	81	1	6	19	46	29	53.2	61	12.9	1.74	67.9	12.1	0.37	56.5	2	56.5	3.50	3	4	6	5	5	191	

LOCATION: *Powell, WY*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS		NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D	C	C	C	G	C	T	VOL (cc)					
					A	B	C	D	INDEX		PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)																		
																HARD- NESS													PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)
ND678	64.5	35.9	69	1	0	3	18	79	68.5	82	13.1	1.72	66.6	11.8	0.35	57.9	2	57.9	3.50	2	3	4	5	5	5	5	164						
ND686	64.7	38.7	77	1	3	15	37	45	57.9	67	12.3	1.64	71.0	11.1	0.34	55.8	2	55.8	3.25	3	3	4	5	5	5	5	171						
N90-0671	62.6	38.2	87	1	2	13	40	45	58.5	76	11.9	1.63	70.4	10.4	0.41	54.6	2	58.6	5.00	2	4	3	4	3	4	4	156						
N90-0666	63.4	40.4	87	1	5	21	39	35	53.7	80	13.5	1.74	70.2	12.6	0.39	58.6	3	58.6	4.00	2	4	4	4	4	4	4	174						
N90-0700	63.4	36.3	66	1	1	3	9	87	71.1	82	13.1	1.63	65.7	11.8	0.38	60.3	3	60.3	3.50	2	3	4	5	5	5	5	172						
N89-0562	63.9	42.4	75	1	0	5	30	65	64.2	80	13.9	1.95	65.6	13.0	0.50	60.0	2	60.0	3.25	3	4	5	5	5	5	5	176						
N89-0059	63.5	44.1	87	1	2	13	36	49	58.8	77	13.3	1.70	65.8	12.1	0.38	59.3	2	59.3	2.50	2	3	4	6	6	6	6	179						
N90-0392	63.2	44.5	89	1	4	25	40	31	54.8	75	12.3	1.64	70.8	11.1	0.41	59.3	3	59.3	3.50	2	3	4	5	5	5	5	167						
N91-3057	63.4	42.8	77	1	2	8	31	59	62.0	68	11.7	1.68	66.5	10.3	0.42	56.2	2	56.2	4.50	2	3	4	4	4	4	4	162						

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):
CRUMB COLOR (CC):
CRUMB GRAIN (CG):
CRUMB TEXTURE (CT):

STICKY-WEAK
YELLOW
IRREG, THICK
HARSH

PLIABLE
GREY

ELASTIC
DULL
OPEN, THICK
COARSE

CREAMY

BUCKY
BRIGHT WHITE
FINE
SILKY

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 13

FARGO, ND

LOCATION: *Sidney, MT*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	FLOUR												
					A	B	C	D					INDEX	PRO	ASH (14 % mb)										
Marquis	60.0	30.3	40	2	1	4	10	85	71.0	83	13.0	1.59	64.0	12.1	0.39	57.3	3	57.3	5.00	2	3	5	2	177	
Chris	60.6	28.1	30	2	1	1	7	91	76.2	79	12.1	1.63	64.8	11.7	0.38	55.0	2	55.0	5.25	6	3	0	0	160	
Era	60.1	29.2	28	4	0	2	7	91	80.1	76	10.3	1.63	61.4	9.1	0.42	50.2	1	50.2	10.00	6	5	0	0	146	
Stoa	60.3	30.9	37	3	0	1	6	93	80.3	89	11.9	1.62	64.6	10.9	0.35	55.3	3	59.0	6.25	2	4	2	3	162	
Butte 86	61.4	33.4	56	2	0	0	3	97	80.0	86	12.3	1.45	64.5	11.2	0.37	56.2	2	56.2	5.00	1	3	2	3	163	
SD0007	60.7	31.2	40	2	0	1	11	88	73.3	67	11.9	1.58	66.3	11.0	0.37	55.8	3	59.4	7.00	3	4	3	3	173	
SD0010	61.1	29.7	30	6	0	0	3	97	82.6	85	12.2	1.52	67.4	11.0	0.33	57.6	3	57.6	6.00	3	4	5	4	170	
SD0014	60.6	32.2	45	2	0	1	9	90	74.8	82	11.7	1.53	66.3	10.9	0.34	55.0	3	55.0	7.25	1	4	3	4	167	
SD3151	62.2	30.5	30	1	0	0	3	97	84.3	75	13.3	1.58	62.8	12.7	0.40	55.5	2	55.5	5.50	1	0	2	3	164	
SD3156	61.6	30.5	35	4	1	1	10	88	74.3	65	12.2	1.68	64.4	11.7	0.32	56.5	2	56.5	5.50	1	3	2	3	167	
SBE0437	59.4	29.8	36	3	1	3	9	87	74.1	80	12.6	1.54	67.4	11.4	0.38	55.8	3	55.8	6.50	1	5	3	3	168	
MN90138	61.4	37.3	69	3	2	1	5	92	81.1	95	11.2	1.63	61.0	9.5	0.46	52.9	2	56.6	7.50	1	3	0	4	155	
MN91277	61.0	31.3	40	3	0	0	7	93	78.2	53	11.8	1.53	63.6	11.4	0.37	50.8	1	54.6	6.00	1	4	0	0	145	
MN91309	61.9	33.1	37	2	0	4	11	85	71.9	64	11.7	1.51	66.2	11.0	0.38	56.2	3	56.2	6.25	1	6	2	4	158	
MN91324	62.2	29.7	38	4	0	1	6	93	81.8	89	11.7	1.54	65.9	10.4	0.41	57.3	3	57.3	5.00	1	5	5	4	167	
MN92006	62.5	32.9	56	2	1	1	10	88	74.3	75	11.0	1.54	65.5	10.3	0.34	50.5	1	54.2	5.75	1	6	3	0	160	
SBE0050	61.0	30.0	14	5	0	0	3	97	79.6	71	11.7	1.60	62.8	11.0	0.40	53.2	2	53.2	8.00	1	4	3	0	168	
ND673	58.2	28.8	26	5	0	2	7	91	78.3	73	13.3	1.75	64.4	13.3	0.38	59.3	4	59.3	7.00	3	4	3	4	192	
ND674	61.4	32.9	66	1	0	2	6	92	76.4	65	12.8	1.64	64.4	11.7	0.40	55.3	3	55.3	7.25	2	4	4	4	172	
ND677	61.8	31.8	48	2	1	4	15	80	69.3	72	11.7	1.63	66.8	11.1	0.36	54.6	3	54.6	5.50	2	6	3	4	178	

LOCATION: *Sidney,MT*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D	Rating-----				LOAF VOL (cc)
					A	B	C	D		INDEX	PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)						C	C	C	T	
ND678	62.2	30.6	41	3	0	0	2	98	86.1	91	12.5	1.54	65.5	11.9	0.36	59.3	3	4.50	2	4	6	4	4	168	
ND686	62.2	32.9	59	3	1	2	9	88	75.3	79	11.6	1.46	67.8	10.9	0.34	56.2	3	6.00	2	4	4	4	4	176	
N90-0671	59.6	30.8	51	2	0	0	4	96	79.7	79	11.0	1.56	65.4	9.7	0.39	52.6	2	8.25	1	0	6	0	0	152	
N90-0666	61.7	33.1	65	2	0	1	15	84	72.5	74	11.6	1.49	67.1	10.9	0.38	54.3	2	6.50	2	0	3	3	3	166	
N90-0700	61.0	27.5	19	6	0	1	3	96	84.1	95	12.1	1.57	63.7	11.2	0.40	59.0	3	4.75	3	4	4	4	4	180	
N89-0562	61.6	34.8	48	2	0	1	6	93	75.9	82	13.3	1.71	63.2	12.9	0.42	56.2	2	4.50	2	0	4	4	4	168	
N89-0059	59.9	32.8	45	3	0	1	4	95	77.5	80	12.0	1.64	64.5	11.1	0.37	56.2	2	4.50	2	6	3	4	4	170	
N90-0392	61.0	32.5	58	3	0	2	7	91	74.1	82	12.2	1.67	63.9	11.0	0.41	58.2	4	5.50	2	4	3	5	5	167	
N91-3057	59.0	32.5	36	3	1	3	6	90	79.5	67	10.2	1.51	61.1	9.4	0.41	52.9	2	8.50	1	6	3	2	2	159	
BW688	60.0	37.9	72	1	0	6	28	66	64.4	69	12.6	1.59	64.9	11.7	0.34	52.9	2	6.00	1	4	3	0	0	167	

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:	0		3		6	
	DOUGH CHAR (DC):	STICKY-WEAK	PLIABLE	ELASTIC	BUCKY	
	CRUMB COLOR (CC):	YELLOW	GREY	DULL	CREAMY	BRIGHT WHITE
	CRUMB GRAIN (CG):	IRREG, THICK		OPEN, THICK		FINE
	CRUMB TEXTURE (CT):	HARSH		COARSE		SILKY

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USDA / ARS
WHEAT QUALITY LAB

Table 14

LOCATION: Williston, ND

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating-----						C T	VOL (cc)		
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	FLOUR		PRO	ASH (14 % mb)						C	C	C	G	T					
					A	B	C	D					INDEX	PRO													ASH (14% mb)				
Marquis	58.4	27.2	12	4	2	4	14	80	69.7	66	14.7	1.45	58.6	13.6	0.35	56.2	2														
Chris	54.5	24.9	17	5	1	5	14	80	70.7	72	15.4	1.33	61.6	14.6	0.37	55.0	2	55.0	4.25	3	3	4	5	5	5	5	5	5	5	202	
Era	52.2	24.9	15	9	1	2	8	89	76.7	62	14.1	1.43	64.3	13.1	0.40	55.5	3	55.5	6.50	3	3	5	5	5	5	5	5	5	191		
Stoa	59.0	26.3	7	6	1	5	12	82	70.3	67	14.6	1.50	65.2	13.7	0.35	58.2	4	58.2	5.25	3	4	3	5	5	5	5	5	5	183		
Butte 86	58.2	28.1	13	5	1	3	13	83	70.2	71	15.0	1.45	66.2	13.4	0.36	57.6	3	57.6	5.00	2	4	3	3	3	3	3	3	3	173		
SD0007	58.3	26.6	21	4	0	4	18	78	69.8	72	14.2	1.48	67.2	13.4	0.35	57.3	4	57.3	6.00	3	3	4	4	4	4	4	4	4	178		
SD0010	58.7	25.8	11	7	0	0	8	92	76.3	71	14.2	1.40	67.2	12.9	0.34	59.3	7	59.3	6.75	2	3	4	4	4	4	4	4	4	162		
SD0014	57.3	26.3	15	6	1	2	14	83	71.4	73	14.3	1.42	66.7	13.4	0.35	57.6	4	57.6	6.50	2	4	4	4	4	4	4	4	4	166		
SD3151	60.2	25.8	5	5	0	2	9	89	75.3	64	15.5	1.43	61.9	14.3	0.39	57.9	3	57.9	6.50	2	4	4	4	2	2	2	2	2	158		
SD3156	61.0	27.2	14	6	4	4	22	70	65.9	52	13.8	1.35	64.3	12.9	0.30	57.9	4	57.9	6.00	2	0	5	2	2	2	2	2	2	164		
SBE0437	58.0	25.9	15	5	1	3	14	82	71.6	69	14.5	1.48	66.1	13.2	0.35	57.3	4	57.3	6.75	2	4	6	2	2	2	2	2	2	162		
MN90138	57.6	30.2	30	3	1	1	7	91	76.7	79	14.8	1.46	64.7	13.1	0.44	57.3	4	57.3	8.00	2	6	3	2	2	2	2	2	2	165		
MN91277	59.1	27.1	17	4	3	4	21	72	66.1	43	14.0	1.47	60.8	13.2	0.36	52.2	1	52.2	5.50	2	4	3	2	2	2	2	2	2	164		
MN91309	59.4	27.8	8	9	1	4	15	80	70.0	72	14.4	1.39	65.7	13.1	0.36	58.2	4	58.2	6.50	2	3	5	5	5	5	5	5	5	168		
MN91324	60.2	25.1	7	9	1	2	4	93	79.8	83	14.3	1.46	64.9	12.8	0.39	58.2	3	58.2	5.00	2	3	5	2	2	2	2	2	2	172		
MN92006	60.4	27.2	17	5	1	6	22	71	68.0	69	13.8	1.48	67.3	12.7	0.34	53.5	2	53.5	6.50	2	3	3	2	2	2	2	2	2	167		
SBE0050	59.6	26.9	4	8	1	1	11	87	74.2	56	13.5	1.41	64.7	12.4	0.36	54.6	3	54.6	8.00	2	3	3	2	2	2	2	2	2	162		
ND673	59.3	28.1	18	5	1	1	9	89	74.3	63	14.2	1.42	64.5	13.4	0.35	58.2	4	58.2	7.00	3	3	3	5	5	5	5	5	5	175		
ND674	58.7	25.8	21	5	0	2	5	93	75.5	74	15.2	1.47	64.7	14.3	0.39	59.3	5	59.3	7.00	3	4	3	4	4	4	4	4	4	176		
ND677	61.0	27.8	11	6	1	8	21	70	65.6	56	14.8	1.45	66.2	14.3	0.35	58.6	4	58.6	5.50	3	3	4	4	4	4	4	4	4	189		

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USDA / ARS
WHEAT QUALITY LAB

Table 14(cont)

FARGO, ND

LOCATION: Williston, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS			NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					A	B	C	D	INDEX	PRO		ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)											
ND678	60.2	25.4	5	7	0	1	6	93	78.6	63	14.6	1.35	62.1	13.5	0.33	60.0	3	60.0	4.50	3	3	3	5	5	5	183
ND686	58.0	24.9	10	8	1	4	8	87	72.4	67	14.5	1.48	66.5	13.8	0.36	59.6	4	59.6	5.50	3	3	3	4	4	5	190
N90-0671	56.4	24.7	13	7	1	1	6	92	76.9	75	14.7	1.55	65.6	13.2	0.40	55.3	3	55.3	8.75	6	0	6	6	2	2	160
N90-0666	59.0	26.6	15	4	1	4	17	78	68.9	83	14.6	1.54	67.1	13.9	0.39	58.6	4	58.6	6.00	3	0	6	4	4	4	175
N90-0700	60.6	25.7	7	7	1	1	5	93	78.4	78	14.0	1.37	63.9	12.7	0.37	57.6	3	57.6	5.50	3	3	4	4	4	4	182
N89-0562	58.5	27.8	8	6	2	2	14	82	69.8	74	15.8	1.69	62.8	15.1	0.43	56.9	2	56.9	4.00	3	3	3	3	4	4	183
N89-0059	56.6	27.6	16	5	1	2	14	83	71.6	64	14.7	1.50	63.3	13.6	0.36	56.2	2	56.2	5.00	3	3	3	3	4	4	184
N90-0392	59.2	28.6	24	4	0	2	16	82	70.0	69	13.6	1.45	65.6	12.2	0.35	58.2	4	58.2	6.00	2	4	6	4	4	4	170
N91-3057	56.3	27.3	6	11	2	3	18	77	68.9	55	13.8	1.46	60.6	13.0	0.39	55.0	3	55.0	8.00	6	0	3	2	2	2	156
BW688	58.9	30.7	36	3	1	3	22	74	67.6	75	15.2	1.40	63.8	14.0	0.37	55.0	2	55.0	5.00	3	5	3	3	2	2	173
BW173	59.1	26.0	5	9	1	3	9	87	72.5	77	14.9	1.39	65.7	14.0	0.36	58.2	4	58.2	5.50	3	4	5	2	2	2	171
BW174	59.2	25.8	3	9	0	4	13	83	72.3	76	15.1	1.36	65.9	14.4	0.36	57.6	4	57.6	5.50	3	5	3	2	2	2	160

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:	0						3			6		
	STICKY-WEAK			PLIABLE			ELASTIC			BUCKY		
	YELLOW			GREY			DULL			BRIGHT WHITE		
	IRREG, THICK			HARSH			OPEN, THICK			FINE		
	CRUMB COLOR (CC):			DOUGH CHAR (DC):			CREAMY			SILKY		
	CRUMB GRAIN (CG):			CRUMB COLOR (CC):			COARSE					
	CRUMB TEXTURE (CT):			CRUMB GRAIN (CG):								

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USDA / ARS
WHEAT QUALITY LAB

Table 15

LOCATION: *Aberdeen, ID*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	FLOUR EXT (%)	FLOUR												
					A	B	C	D					INDEX	PRO	ASH (14 % mb)										
Marquis	60.6	40.0	85	1	9	24	34	33	53.6	78	16.1	1.74	67.1	15.6	0.35	64.4	3	64.4	2.50	3	4	5	6	200	
Chris	60.6	34.4	70	1	9	18	33	40	58.2	71	15.3	1.57	67.3	14.7	0.34	61.1	3	61.1	2.50	2	3	6	5	190	
Era	62.3	35.8	74	1	5	18	32	45	57.7	73	13.4	1.57	70.7	11.9	0.36	57.9	2	57.9	3.50	2	5	6	5	197	
Stoa	61.0	39.3	79	1	5	26	45	24	52.8	71	15.3	1.59	69.2	14.3	0.35	61.4	2	61.4	3.75	2	3	6	6	195	
Butte 86	61.0	41.6	87	1	11	27	36	26	51.1	78	15.7	1.67	67.3	14.7	0.35	64.4	2	64.4	2.50	2	3	6	6	192	
SD0007	60.6	37.3	78	1	10	29	35	26	50.9	70	13.2	1.55	71.5	11.6	0.36	60.5	3	60.5	3.50	2	3	4	4	192	
SD0010	60.4	37.1	73	1	6	18	34	42	58.8	78	14.8	1.67	69.3	13.5	0.35	63.7	3	63.7	3.50	3	3	3	6	203	
SD0014	61.1	41.5	86	1	13	36	32	19	47.6	75	14.2	1.61	70.3	12.9	0.34	60.5	2	60.5	3.25	2	3	3	3	183	
SD3151	59.6	35.8	65	1	3	19	36	42	62.1	77	17.0	1.74	64.9	16.7	0.44	61.1	3	61.1	3.50	3	4	5	6	198	
SD3156	62.2	39.3	83	1	14	31	36	19	48.2	66	14.5	1.66	67.4	13.3	0.34	61.4	2	61.4	3.25	2	3	2	6	189	
SBE0437	61.0	42.5	88	1	16	45	28	11	43.9	72	14.2	1.64	68.8	13.0	0.34	60.5	2	60.5	3.50	2	3	5	5	203	
MN90138	60.6	50.6	95	1	7	23	45	25	51.6	92	15.4	1.77	64.2	13.7	0.47	62.1	2	62.1	3.00	2	3	6	5	186	
MN91277	61.8	38.2	78	1	5	23	35	37	54.4	61	13.0	1.61	67.9	11.8	0.40	55.5	1	55.5	3.00	1	4	4	4	166	
MN91309	61.9	44.9	82	1	12	44	30	14	45.9	72	15.6	1.69	66.8	14.3	0.36	63.1	3	63.1	3.50	3	5	4	6	195	
MN91324	61.2	40.2	75	2	9	26	37	28	51.7	87	15.4	1.77	67.8	14.9	0.43	63.4	3	63.4	3.00	3	4	4	6	210	
MN92006	62.8	39.1	80	1	4	31	39	26	52.1	76	14.2	1.50	70.9	13.1	0.35	57.6	2	57.6	3.50	2	3	3	4	182	
SBE0050	60.5	38.0	69	1	5	28	37	30	53.1	72	14.3	1.59	68.8	13.7	0.41	60.5	2	60.5	3.50	2	5	3	5	203	
ND673	61.4	41.2	85	1	4	11	40	45	57.6	70	16.0	1.58	67.1	15.2	0.34	62.7	3	62.7	4.00	3	5	5	5	209	
ND674	61.8	40.3	83	1	1	11	44	44	58.3	79	15.8	1.74	66.0	15.6	0.39	61.8	3	61.8	4.00	3	3	4	5	211	
ND677	61.3	39.6	84	1	15	40	36	9	44.9	66	15.7	1.71	66.5	14.9	0.38	61.4	2	61.4	3.00	3	3	5	5	213	

Table 15(cont)

FARGO, ND

DISTRIBUTION: A = % Soft		RATINGS:			
		0	3	6	
B = % Semi-Soft	DOUGH CHAR (DC):	STICKY-WEAK	PLIABLE	ELASTIC	BUCKY
C = % Semi-Hard	CRUMB COLOR (CC):	YELLOW	GREY	DULL	CREAMY
	CRUMB GRAIN (CG):	IRREG, THICK		OPEN, THICK	BRIGHT WHITE
D = % Hard	CRUMB TEXTURE (CT):	HARSH		COARSE	FINE
					SILKY

D = % Hard

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USDA / ARS
WHEAT QUALITY LAB

Table 16

LOCATION: *Bozeman, MT*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS			NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					A	B	C	DISTRIBUTION			HARD- NESS	PRO	ASH (14% mb)	EXT (%)	FLOUR		FLOUR										
								D	INDEX	INDEX					PRO	ASH (14 % mb)	PRO	ASH (14 % mb)									
Marquis	58.7	30.1	36	1	2	6	25	67	69.4	74	14.9	1.55	65.8	14.3	0.41	57.9	3	57.9	4.00	3	3	4	4	4	187		
Chris	62.2	28.8	27	2	2	4	19	75	71.6	72	14.8	1.42	67.1	14.4	0.37	57.6	2	57.6	3.50	2	4	3	5	5	178		
Era	62.2	29.8	31	2	0	2	11	87	74.4	64	12.7	1.41	65.7	11.5	0.39	53.5	2	57.4	6.00	2	4	6	3	3	169		
Stoa	60.8	30.4	27	3	1	2	17	80	69.6	72	14.7	1.48	67.2	14.1	0.37	59.6	4	59.6	5.00	3	4	4	5	5	192		
Butte 86	61.8	35.3	55	1	1	5	33	61	64.7	71	14.6	1.44	67.1	13.7	0.36	60.0	2	60.0	3.50	2	3	5	5	5	173		
SD0007	61.0	33.1	48	2	1	6	31	62	64.3	74	14.4	1.55	68.9	13.4	0.37	59.0	3	59.0	4.00	3	3	4	5	5	197		
SD0010	61.8	32.3	36	3	1	2	16	81	70.8	65	13.7	1.38	68.8	12.4	0.33	59.0	3	59.0	4.50	3	4	6	5	5	182		
SD0014	61.8	34.5	52	1	1	4	31	64	63.0	65	13.4	1.47	69.1	12.2	0.33	58.2	2	58.2	4.50	2	4	3	3	3	173		
SD3151	61.6	30.2	15	2	0	2	11	87	75.3	70	15.3	1.40	64.9	14.8	0.39	58.6	3	58.6	4.00	3	4	3	5	5	180		
SD3156	63.2	31.7	46	2	1	4	24	71	70.9	58	13.9	1.43	68.5	13.3	0.33	59.6	3	59.6	4.00	3	4	5	5	5	184		
SBE0437	61.4	31.6	50	1	0	5	24	71	68.2	73	13.9	1.45	69.9	12.7	0.36	60.0	3	60.0	4.00	3	4	3	5	5	185		
MN90138	61.0	39.2	70	2	1	4	29	66	69.7	86	15.1	1.64	66.0	13.7	0.48	59.3	2	59.3	3.75	2	5	5	4	4	184		
MN91277	60.9	31.0	28	3	2	7	25	66	64.6	42	13.6	1.53	65.9	13.2	0.38	57.3	2	57.3	3.50	3	4	5	4	4	188		
MN91309	61.3	34.1	29	4	1	9	35	55	65.5	64	13.7	1.41	69.0	12.7	0.38	61.4	4	61.4	5.00	3	4	5	5	5	189		
MN91324	62.3	29.9	24	4	3	1	9	87	76.7	74	13.7	1.48	68.9	12.5	0.42	60.5	3	60.5	4.00	3	3	5	5	5	190		
MN92006	63.3	31.7	50	1	1	4	23	72	66.9	69	13.4	1.52	71.6	12.7	0.35	55.5	2	59.4	4.00	2	3	5	4	4	180		
SBE0050	60.9	29.7	11	7	1	2	8	89	73.9	57	13.3	1.46	66.1	12.6	0.37	58.2	4	58.2	6.50	6	3	5	5	5	183		
ND673	63.0	32.4	53	2	0	2	21	77	68.3	66	14.1	1.39	69.7	13.2	0.34	60.0	3	60.0	5.00	3	3	3	5	5	193		
ND674	61.8	31.2	46	2	0	2	13	85	72.5	70	15.1	1.51	67.0	14.5	0.39	60.8	3	60.8	4.50	3	3	6	5	5	190		
ND677	62.8	32.3	44	1	1	7	31	61	63.7	58	14.4	1.45	69.6	14.2	0.36	60.8	3	60.8	4.50	3	3	3	5	5	206		

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USDA / ARS
WHEAT QUALITY LAB

Table 16(cont)

LOCATION: *Bozeman, MT* FARGO, ND

LOCATION, <i>Bozeman, MT</i>																								
VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR EXT (%)	FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)	
					DISTRIBUTION					PRO	ASH (14% mb)		PRO	ASH (14 % mb)										
					A	B	C	D																
NND678	62.9	30.2	27	2	0	2	16	82	71.7	69	14.8	1.40	68.9	13.9	0.36	61.8	3	61.8	3.50	3	3	4	5	194
NND686	62.8	30.2	45	3	0	1	16	83	71.3	64	13.6	1.38	69.8	12.8	0.35	58.6	2	58.6	4.25	3	4	4	4	188
N90-0671	60.2	28.8	34	3	1	1	18	80	75.0	79	13.8	1.53	67.8	12.7	0.40	57.3	2	57.3	5.25	2	4	4	4	180
N90-0666	62.2	33.1	55	1	2	7	26	65	66.0	85	14.2	1.59	70.2	13.5	0.40	60.0	3	60.0	4.00	3	4	3	5	190
N90-0700	61.7	28.2	16	2	0	0	3	97	89.7	76	14.0	1.37	66.8	12.9	0.39	59.3	2	63.0	3.50	3	3	5	5	202
N89-0562	61.6	34.4	31	2	1	5	24	70	68.5	68	14.5	1.57	68.0	14.0	0.43	60.3	2	60.3	3.50	3	3	5	6	188
N89-0059	61.7	34.5	57	2	0	6	23	71	69.9	66	13.2	1.42	70.0	12.4	0.39	60.0	2	60.0	3.00	2	3	3	4	192
N90-0392	61.7	33.0	61	1	1	4	23	72	72.9	77	13.5	1.49	68.5	12.5	0.40	60.5	3	60.5	4.00	3	3	4	5	195
N91-3057	62.1	35.9	48	2	1	5	22	72	68.8	63	12.0	1.34	68.3	10.8	0.37	58.2	2	58.2	5.50	2	3	3	4	184
BW688	62.2	37.3	67	1	0	7	28	65	74.1	71	14.3	1.45	69.1	13.6	0.36	59.0	2	59.0	3.50	3	3	4	5	193

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:	0			3			6		
	STICKY-WEAK			ELASTIC			BUCKY		
	CRUMB COLOR (CC):			DULL			BRIGHT WHITE		
	CRUMB TEXTURE (CT):			COARSE			FINE SILKY		
	DOUGH CHAR (DC):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):
	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):
	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):
	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):	CRUMB TEXTURE (CT):	CRUMB COLOR (CC):	CRUMB GRAIN (CG):

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USDA / ARS
WHEAT QUALITY LAB

Table 17

LOCATION: *Havre, MT*

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating-----						LOAF VOL (cc)
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	C	C						G	T					
					A	B	C	D																INDEX				
Marquis	56.2	22.0	3	15	0	1	3	96	97.3	73	16.4	1.68	66.1	15.1	0.46	57.9	3	57.9	4.00	3	4	3	4	187				
Chris	55.8	21.0	1	26	1	1	3	95	107.2	73	16.9	1.59	67.7	16.1	0.44	60.0	3	60.0	3.50	3	4	3	4	187				
Era	52.2	20.5	1	42	3	1	5	91	102.3	72	16.2	1.81	65.1	15.2	0.50	59.3	4	59.3	5.25	3	0	3	4	204				
Stoa	54.6	21.9	1	32	1	2	3	94	103.3	68	16.7	1.68	66.6	16.3	0.45	64.0	5	64.0	4.50	3	0	5	4	193				
Butte 86	55.8	23.1	2	17	1	2	1	96	100.3	72	16.4	1.60	66.3	15.5	0.45	64.0	5	64.0	4.50	3	4	4	4	188				
SD0007	56.1	23.1	5	11	1	1	3	95	103.9	80	15.9	1.54	69.6	14.9	0.44	61.4	3	61.4	4.50	3	4	4	4	187				
SD0010	58.1	23.8	3	12	0	0	3	97	99.2	72	15.7	1.48	69.4	14.5	0.43	61.8	5	61.8	6.25	3	6	5	6	199				
SD0014	56.6	23.8	4	11	0	1	5	94	96.9	74	16.0	1.61	68.8	15.2	0.44	61.4	5	61.4	5.00	3	4	3	3	185				
SD3151	57.0	22.5	1	26	0	2	4	94	106.9	70	16.8	1.56	64.6	16.1	0.47	60.8	4	60.8	5.00	3	4	4	5	192				
SD3156	58.6	23.9	3	16	0	5	9	86	88.9	48	14.9	1.51	66.4	13.9	0.37	60.3	5	60.3	5.50	2	0	3	5	180				
SBE0437	56.0	23.5	5	11	1	1	4	94	103.1	81	16.0	1.51	69.8	14.7	0.43	60.3	3	60.3	4.50	3	4	5	5	182				
MN90138	55.5	27.0	15	8	1	1	7	91	90.8	85	16.6	1.70	65.9	15.4	0.54	59.3	4	63.0	6.50	6	5	4	5	174				
MN91277	56.6	23.7	2	12	0	2	7	91	94.2	48	15.0	1.59	64.0	14.3	0.42	55.0	2	55.0	4.25	2	3	3	2	170				
MN91309	55.2	23.6	1	30	2	3	6	89	96.1	73	16.5	1.57	66.6	15.8	0.45	62.5	5	62.5	6.00	3	4	5	5	184				
MN91324	56.8	22.1	1	29	2	1	2	95	107.5	83	16.7	1.60	66.0	15.6	0.48	63.1	5	63.1	4.50	3	4	4	5	188				
MN92006	56.4	23.6	3	15	3	4	6	87	88.2	72	15.5	1.63	68.0	14.6	0.42	58.6	4	58.6	5.00	2	5	4	3	178				
SBE0050	55.5	22.8	1	21	1	2	5	92	93.0	61	15.8	1.62	65.2	15.1	0.43	61.8	5	61.8	6.00	3	3	3	5	198				
ND673	54.6	23.3	1	25	3	4	4	89	94.5	66	16.6	1.73	66.0	16.2	0.44	63.1	5	63.1	5.25	3	3	3	5	200				
ND674	55.4	22.9	4	16	1	2	3	94	99.8	76	16.8	1.64	65.1	16.4	0.49	62.1	5	62.1	5.50	3	0	6	5	197				
ND677	59.5	24.0	3	9	1	2	6	91	88.6	64	16.2	1.51	68.5	15.6	0.41	61.4	4	61.4	4.50	3	4	3	5	200				

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USDA / ARS
WHEAT QUALITY LAB

Table 17(cont)

FARGO, ND

LOCATION: *Havre, MT*

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS		NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D	C	C	C	T	VOL (cc)
					A	B	C	D	INDEX	PRO		ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)												
D		C		C		G		Rating-----																			

ND678	57.9	22.0	1	24	0	1	3	96	114.3	73	16.4	1.48	65.4	15.5	0.41	62.7	4	62.7	3	4	5	5	5	195
ND686	55.0	21.7	1	25	2	0	7	91	97.4	66	16.2	1.57	66.6	15.6	0.41	60.5	5	60.5	3	0	3	5	5	211
N90-0671	52.8	21.8	2	19	1	2	4	93	102.9	84	16.5	1.68	66.0	15.3	0.48	58.6	5	58.6	6	0	3	2	2	181
N90-0666	56.2	24.9	5	7	1	2	3	94	94.7	89	16.1	1.59	68.8	15.2	0.48	61.4	4	61.4	2	0	5	5	5	175
N90-0700	58.7	22.8	2	15	0	1	2	97	109.4	81	15.9	1.45	64.2	14.9	0.42	60.5	4	60.5	3	3	3	5	5	190
N89-0562	55.9	24.0	1	26	1	2	3	94	105.6	79	17.5	1.81	65.2	17.0	0.51	60.3	3	60.3	3	0	4	5	5	193
N89-0059	53.8	22.8	1	18	1	2	7	90	88.9	75	16.7	1.77	66.0	16.0	0.48	60.0	3	60.0	3	3	3	4	4	198
N90-0392	54.2	22.8	1	28	1	1	3	95	110.2	76	16.0	1.68	65.9	15.4	0.46	59.6	5	59.6	3	3	3	4	4	190
N91-3057	53.6	23.5	9	5	1	4	7	88	86.9	63	15.8	1.58	68.0	14.6	0.50	58.2	3	58.2	2	3	6	4	4	197
BW688	57.4	28.3	3	16	0	2	7	91	101.1	81	15.9	1.49	65.2	15.0	0.49	64.0	5	64.0	3	4	3	6	6	209

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:		0		3		6	
		STICKY-WEAK		PLIABLE		ELASTIC	
		YELLOW		GREY		DULL	
		IRREG, THICK		OPEN, THICK		CREAMY	
DOUGH CHAR (DC):							
CRUMB COLOR (CC):							
CRUMB GRAIN (CG):							
CRUMB TEXTURE (CT):		HARSH		COARSE		BUCKY	
						BRIGHT WHITE	
						FINE	
						SILKY	

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 18

LOCATION: Pullman, WA

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS		NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating				LOAF VOL (cc)	
					DISTRIBUTION				INDEX	NIR		PRO	ASH (14% mb)	EXT (%)	FLOUR		PRO						ASH (14% mb)	C	C	G		T
					A	B	C	D							PRO	ASH (14% mb)												
Marquis	60.3	31.7	37	1	1	6	20	73	66.0		76	12.9	1.63	63.9	12.7	0.44	55.8	2	55.8	5.50	1	3	4	3	153			
Chris	60.2	28.0	15	3	1	5	20	74	67.3		69	13.1	1.54	59.9	12.5	0.39	53.2	2	57.0	6.00	1	3	5	3	147			
Era	60.4	28.7	15	3	0	2	11	87	73.9		78	11.2	1.56	64.3	10.2	0.41	50.8	1	54.6	7.00	1	3	4	3	150			
Stoa	60.3	28.3	12	2	1	2	8	89	74.0		74	12.8	1.53	64.6	12.1	0.38	57.6	3	57.6	6.25	1	3	5	4	172			
Butte 86	60.9	31.5	22	1	0	5	15	80	68.1		82	11.7	1.55	64.7	10.5	0.39	55.0	2	59.0	5.50	1	3	5	3	156			
SSD0007	59.2	29.5	23	2	3	11	29	57	62.0		84	13.6	1.62	67.1	12.2	0.38	58.6	3	58.6	5.50	1	5	5	3	181			
SSD0010	59.7	29.3	20	2	1	3	11	85	70.7		85	12.8	1.41	66.5	11.7	0.35	58.6	3	58.6	6.25	1	3	5	3	167			
SSD0014	59.3	30.4	27	2	1	4	19	76	67.6		84	12.8	1.50	66.7	11.9	0.37	56.5	3	56.5	6.00	1	3	5	3	162			
SSD3151	61.0	28.1	6	3	1	2	4	93	76.1		71	12.8	1.41	63.3	12.2	0.39	56.2	2	60.2	5.50	1	4	4	3	156			
SSD3156	62.5	30.0	21	3	0	3	14	83	70.4		63	11.7	1.45	64.6	10.6	0.31	54.3	2	54.3	7.00	1	4	3	3	143			
SBE0437	60.1	29.5	26	2	1	4	14	81	69.9		83	12.1	1.51	64.2	11.0	0.37	57.3	3	57.3	7.00	2	3	3	3	160			
MN90138	59.4	35.3	44	1	0	2	16	82	70.7		86	13.2	1.58	63.2	12.5	0.47	56.2	2	60.2	6.25	2	5	3	4	174			
MN91277	59.8	30.2	20	3	2	9	26	63	63.0		67	12.1	1.62	63.4	11.7	0.40	54.3	1	54.3	4.50	1	3	4	4	164			
MN91309	61.0	31.0	16	2	1	4	19	76	67.7		81	12.4	1.39	65.1	11.4	0.36	58.2	3	58.2	6.00	1	3	4	4	152			
MN91324	60.9	28.5	11	4	0	3	7	90	75.4		84	12.0	1.52	63.8	10.7	0.42	56.9	3	56.9	6.00	1	4	4	4	161			
MN92006	61.0	30.6	22	1	1	4	16	79	68.3		82	11.7	1.49	66.3	10.5	0.35	52.2	2	52.2	6.50	1	5	5	2	145			
SBE0050	60.8	29.7	7	4	1	3	10	86	71.8		66	11.3	1.50	63.5	10.8	0.37	54.6	2	54.6	9.00	2	3	3	3	148			
JND673	61.4	30.9	34	1	1	2	11	86	74.0		77	12.6	1.51	64.9	11.5	0.35	55.3	2	59.0	8.00	3	3	3	4	170			
JND674	61.0	29.5	33	2	0	2	10	88	76.2		68	12.5	1.54	62.7	11.8	0.41	56.2	3	60.2	8.50	2	3	3	4	154			
JND677	61.7	29.3	21	2	1	3	20	76	67.9		71	12.4	1.56	65.0	11.6	0.37	54.3	3	58.2	8.00	3	3	3	4	161			

FARGO, ND																										
LOCATION: Pullman, WA																										
VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS		NIR	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					DISTRIBUTION				INDEX			HARD- NESS	PRO (14% mb)	ASH (14% mb)	EXT (%)	PRO (14 % mb)	ASH (14 % mb)									
					A	B	C	D	INDEX	PRO																
ND678	62.2	27.9	10	3	1	2	6	91	75.6	80	11.9	1.49	63.4	10.9	0.36	57.3	2	61.3	5.50	3	5	3	4	4	166	
ND686	61.4	30.3	28	2	0	1	8	91	72.7	72	11.3	1.51	64.8	10.1	0.38	53.2	2	57.0	8.25	2	4	3	3	3	155	
N90-0671	59.2	29.0	24	3	0	3	17	80	71.2	61	11.1	1.57	65.1	10.9	0.40	53.2	2	57.0	9.00	1	0	2	2	2	145	
N90-0666	60.3	30.4	27	1	3	2	21	74	65.4	90	12.0	1.56	67.3	12.2	0.40	57.6	2	57.6	6.00	2	0	5	3	3	157	
N90-0700	61.2	26.9	10	3	0	1	2	97	84.3	82	12.2	1.48	61.1	11.1	0.40	57.3	2	57.3	5.00	2	4	3	4	4	160	
N89-0562	60.4	32.6	15	2	1	2	10	87	69.7	82	13.7	1.71	61.7	12.4	0.46	55.5	1	55.5	4.00	2	4	3	3	3	161	
N89-0059	59.2	32.1	33	2	1	2	13	84	69.9	75	11.7	1.57	63.8	10.8	0.51	52.6	1	56.6	6.00	2	4	4	4	3	148	
N90-0392	60.7	31.7	37	1	0	3	20	77	66.7	82	12.4	1.47	64.7	11.3	0.40	57.6	2	57.6	5.75	2	4	3	4	4	162	
N91-3057	59.7	33.4	27	3	1	5	21	73	66.5	71	11.2	1.54	63.1	10.3	0.42	54.3	2	54.3	7.50	2	4	3	2	2	150	

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):

CRUMB COLOR (CC):

CRUMB GRAIN (CG):

CRUMB TEXTURE (CT):

STICKY-WEAK

YELLOW

IRREG, THICK

HARSH

PLIABLE

GREY

OPEN, THICK

COARSE

ELASTIC

DULL

CREAMY

BUCKY

BRIGHT WHITE

FINE

SILKY

6

3

0

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 19

FARGO, ND

LOCATION: Tetonia, ID

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS				HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating					LOAF VOL (cc)
					DISTRIBUTION				INDEX				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	MIX ABS	MIX PAT					C G	C T	C T			
					A	B	C	D	A	B	C	D																		
Era	59.9	25.7	11	8	0	1	5	94	97.3	80	14.9	1.60	69.9	13.6	0.40	59.0	2	59.0	4.50	2	5	5	5	5	5	5	190			
Butte 86	60.2	24.9	5	5	0	1	2	97	116.4	79	15.5	1.50	67.2	14.5	0.35	60.0	2	60.0	3.50	2	3	5	5	5	5	5	5	174		
SD0007	59.9	26.7	14	3	0	2	6	92	101.3	80	15.2	1.53	69.4	13.8	0.36	59.6	2	59.6	3.00	3	3	5	5	5	5	5	5	188		
SD0010	59.5	24.4	3	5	0	1	2	97	114.3	83	15.2	1.46	68.6	14.0	0.38	59.3	2	59.3	4.00	2	3	5	5	5	5	5	5	183		
SD0014	59.4	26.0	9	4	2	2	5	91	96.3	76	15.5	1.50	68.5	13.9	0.37	57.9	2	57.9	3.50	2	5	5	5	5	5	5	5	191		
SD3151	59.5	24.0	2	15	0	0	4	96	127.1	78	16.3	1.55	66.2	15.3	0.43	59.6	2	59.6	4.00	2	3	4	5	5	5	5	5	184		
SD3156	61.2	26.9	9	6	1	4	8	87	89.7	57	15.0	1.47	67.5	13.9	0.30	56.9	2	56.9	5.00	2	0	4	5	5	5	5	5	175		
SBE0437	60.0	27.4	14	2	2	2	10	86	93.2	82	15.7	1.49	68.2	14.5	0.35	58.2	2	58.2	3.00	3	5	4	5	5	5	5	5	190		
MN90138	59.8	32.0	31	2	0	1	5	94	90.5	91	16.4	1.77	65.7	14.7	0.52	59.0	2	59.0	3.50	2	5	4	5	5	5	5	5	182		
MN91277	59.5	28.0	10	5	3	4	9	84	92.8	52	15.3	1.72	67.2	14.9	0.41	55.5	2	55.5	3.25	3	3	6	6	6	6	6	6	192		
MN91309	60.5	30.7	7	4	4	3	7	86	97.8	68	15.1	1.48	67.7	13.5	0.40	58.2	2	58.2	3.50	3	5	4	5	5	5	5	5	193		
MN91324	59.9	24.8	4	12	1	3	4	92	103.3	88	15.4	1.51	67.3	14.3	0.43	60.0	3	60.0	4.25	3	3	4	5	5	5	5	5	189		
MN92006	60.2	27.5	11	3	1	4	7	88	92.7	77	15.3	1.41	70.0	14.4	0.35	56.9	2	56.9	3.50	3	5	4	5	5	5	5	5	185		
SBE0050	61.0	27.3	5	6	2	0	4	94	92.1	70	14.1	1.42	66.8	13.5	0.35	57.6	4	57.6	6.50	2	6	5	5	5	5	5	5	182		
ND673	60.6	25.4	9	6	2	1	5	92	89.9	74	15.5	1.47	68.1	14.7	0.35	59.3	4	59.3	4.25	3	5	4	5	5	5	5	5	190		
ND674	60.3	27.0	9	4	1	1	9	89	84.4	81	15.8	1.49	66.6	15.5	0.41	61.4	4	61.4	4.50	2	0	5	6	6	6	6	6	187		
ND677	60.9	26.8	9	2	2	5	19	74	72.7	61	15.5	1.49	69.0	14.6	0.36	60.3	3	60.3	4.00	3	5	5	6	6	6	6	6	207		
ND678	60.3	24.3	2	10	1	4	6	89	88.6	76	15.6	1.48	65.7	14.4	0.35	60.8	3	60.8	3.50	3	5	6	6	6	6	6	6	194		
ND686	60.3	27.4	11	6	2	4	16	78	71.5	68	14.9	1.45	68.9	14.1	0.36	60.0	3	60.0	4.00	3	4	3	5	5	5	5	5	200		
N90-0671	58.9	28.1	23	3	2	4	16	78	69.6	92	15.8	1.63	65.3	14.8	0.41	56.9	3	56.9	5.00	2	4	6	5	5	5	5	5	175		

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 19(cont)

LOCATION: Tetonia, ID

FARGO, ND

VARIETY	TW (lb/bu)	KWT (gr)	LG (%)	SM (%)	SKWCS			HARDNESS		NIR		WHEAT		FLOUR EXT (%)	FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C	C C	C G	C T	LOAF VOL (cc)
					DISTRIBUTION			INDEX	HARD- NESS	PRO	ASH (14% mb)	PRO	ASH (14 % mb)												
					A	B	C								D										
N90-0666	59.8	27.3	16	3	1	4	15	80	70.0	90	16.0	1.73	67.3	14.7	0.46	60.3	3	60.3	4.50	2	4	3	4	4	175
N90-0700	59.5	24.5	3	6	1	2	3	94	86.5	89	15.9	1.46	63.7	14.4	0.41	59.6	2	59.6	3.25	3	3	4	5	5	188
N89-0562	59.2	28.1	3	8	2	4	16	78	68.9	78	16.1	1.81	65.3	15.2	0.45	55.5	2	55.5	4.00	2	4	6	4	4	180
N89-0059	58.2	30.7	22	3	2	6	16	76	66.5	78	15.2	1.61	65.9	14.2	0.41	57.3	1	57.3	3.25	2	4	4	5	5	187
N90-0392	58.2	26.5	19	5	2	3	8	87	72.8	83	15.4	1.59	65.2	14.0	0.42	60.5	3	60.5	5.00	2	3	4	5	5	195
N91-3057	58.8	28.5	13	11	3	5	18	74	67.1	64	13.9	1.50	66.1	13.3	0.40	57.6	3	57.6	5.50	2	3	3	4	4	182
WPB926	60.0	32.8	25	1	3	9	38	50	60.2	15	15.5	1.56	65.0	14.8	0.37	59.3	3	59.3	5.00	3	3	3	6	6	200
Centennial	60.4	25.8	6	12	63	17	12	8	30.9	58	15.3	1.39	56.1	12.0	0.33	53.8	1	53.8	3.00	3	3	4	5	5	187
Vandal	59.3	26.4	11	8	3	7	22	68	66.8	54	15.8	1.59	66.7	15.0	0.37	59.3	3	59.3	5.00	3	3	3	5	5	218

DISTRIBUTION: A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:	0						3			6		
	STICKY-WEAK			PLIABLE			ELASTIC			BUCKY		
	YELLOW			GREY			DULL			CREAMY		
	IRREG, THICK			OPEN, THICK			COARSE			FINE		
	HARSH			CRUMB TEXTURE (CT):			BRIGHT WHITE			SILKY		

**USDA / ARS
WHEAT QUALITY LAB**

Average of locations in Northeast region

Average of rotations in 1990-1992																		
VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR	WHEAT (14% mb)		FLOUR (14 % mb)		MIX PAT	BAKE ABS	MIX TIME (min)	D C	Rating			LOAF VOL (cc)	
			HARDNESS INDEX	NESS		PRO	ASH (14% mb)	EXT (%)	PRO (14 % mb)					ASH (14 % mb)	C C	C G		T
Std	Butte 86	58.9	33.2	71.0	71.8	14.8	1.68	66.9	13.8	0.39	2.8	59.9	3.31	2.8	3.3	3.8	4.8	192.8
	Marquis	57.8	28.3	66.5	<u>72.3</u>	14.5	<u>1.64</u>	64.6	13.7	0.42	2.5	58.8	3.50	2.5	3.0	3.8	4.5	189.0
	Chris	57.2	27.1	70.3	<u>72.0</u>	<u>15.1</u>	<u>1.65</u>	65.3	<u>14.7</u>	0.41	<u>3.0</u>	<u>60.4</u>	3.50	2.5	3.0	3.8	4.8	<u>196.5</u>
	Era	54.7	25.7	<u>73.3</u>	64.8	13.9	1.79	66.7	13.0	0.49	2.5	56.8	4.38	2.8	3.3	<u>4.0</u>	4.0	<u>200.8</u>
	Stoa	57.5	29.4	<u>73.5</u>	67.3	<u>15.1</u>	1.69	66.3	<u>14.5</u>	0.40	<u>3.8</u>	<u>61.1</u>	4.38	2.8	<u>3.5</u>	3.3	4.5	<u>195.5</u>
	SD0007	57.4	30.1	67.4	70.0	14.1	1.71	<u>69.4</u>	13.1	0.41	2.8	59.7	3.94	3.0	3.0	<u>4.8</u>	4.8	<u>198.3</u>
	SD0010	57.3	29.1	<u>72.6</u>	69.3	14.4	1.71	<u>68.9</u>	13.3	<u>0.38</u>	<u>3.5</u>	59.3	4.56	3.0	2.5	3.3	4.8	<u>196.0</u>
	SD0014	56.8	30.9	70.2	<u>72.8</u>	14.2	1.69	<u>68.2</u>	13.3	0.39	2.8	58.5	4.44	2.8	3.3	<u>4.3</u>	<u>5.0</u>	<u>196.0</u>
	SD3151	58.9	29.7	69.1	60.5	<u>15.4</u>	1.77	62.2	<u>14.9</u>	0.42	2.5	57.1	4.88	3.0	2.0	3.8	4.8	<u>196.5</u>
	SD3156	<u>60.1</u>	31.4	67.3	61.8	14.4	<u>1.67</u>	65.9	13.7	<u>0.35</u>	<u>3.0</u>	58.8	3.94	3.0	<u>3.8</u>	3.8	<u>5.0</u>	<u>193.8</u>
	SBE0437	56.7	30.3	68.9	69.8	14.6	1.74	66.6	13.7	0.41	2.8	59.4	3.88	2.8	<u>4.0</u>	<u>4.3</u>	<u>5.0</u>	<u>196.0</u>
	MN90138	55.6	<u>34.5</u>	<u>73.6</u>	<u>80.5</u>	14.6	1.86	65.8	13.3	0.52	<u>3.3</u>	59.3	4.13	2.5	<u>4.0</u>	<u>4.3</u>	<u>5.0</u>	<u>197.5</u>
	MN91277	56.6	29.2	67.3	47.0	13.9	1.79	63.2	13.4	0.48	1.5	55.7	3.31	2.0	1.8	3.8	4.5	<u>193.0</u>
	MN91309	58.4	30.9	64.9	64.3	14.1	1.69	<u>67.7</u>	13.2	0.39	<u>3.3</u>	<u>60.3</u>	4.50	3.0	<u>3.8</u>	<u>4.0</u>	<u>5.0</u>	<u>201.8</u>
	MN91324	58.4	28.8	<u>75.3</u>	<u>77.0</u>	<u>14.8</u>	1.77	<u>67.3</u>	<u>14.0</u>	0.44	2.5	<u>61.2</u>	3.44	3.0	<u>3.8</u>	3.8	4.8	<u>203.8</u>
	MN92006	<u>59.3</u>	30.0	63.0	59.5	13.8	<u>1.63</u>	<u>68.5</u>	13.2	<u>0.39</u>	2.0	55.7	3.69	2.5	<u>3.8</u>	<u>5.0</u>	4.5	186.3
	SBE0050	57.5	28.3	<u>77.0</u>	62.5	13.9	1.71	66.0	13.2	0.42	<u>3.5</u>	58.8	5.38	2.5	2.3	<u>4.3</u>	4.5	<u>203.0</u>
	ND673	58.7	32.7	<u>73.0</u>	67.8	<u>15.0</u>	1.74	<u>68.3</u>	<u>14.5</u>	0.48	<u>3.5</u>	<u>60.5</u>	4.63	3.0	3.3	3.5	4.5	<u>205.0</u>
	ND674	<u>59.2</u>	30.4	<u>72.8</u>	66.5	<u>15.8</u>	1.74	<u>67.0</u>	<u>15.4</u>	0.40	<u>4.5</u>	<u>61.9</u>	4.88	3.0	2.5	2.3	<u>5.0</u>	<u>207.0</u>

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 20(cont)

FARGO, ND

Average of locations in *Northeast* region

VARIETY	TW		KWT		SKWCS		NIR		WHEAT		FLOUR		FLOUR		MIX		BAKE		MIX		D		C		C		LOAF	
	(lb/bu)		(gr)		HARDNESS		HARD-		PRO		ASH		EXT		PAT		ABS		TIME		C		C		G		T	
	INDEX		NESS		(14% mb)		(14% mb)		(14% mb)		(14% mb)		(14% mb)		(min)		Rating		(cc)									
ND677	58.1	29.8	62.4	58.8	15.0	1.75	66.2	14.6	0.40	3.8	60.3	3.94	2.8	2.5	3.5	4.8	203.5											
ND678	<u>59.1</u>	28.9	<u>74.7</u>	<u>72.8</u>	<u>15.3</u>	1.72	65.7	<u>14.4</u>	<u>0.39</u>	2.8	<u>60.3</u>	3.38	2.8	<u>4.5</u>	3.5	<u>5.0</u>	<u>200.0</u>											
ND686	58.9	30.4	<u>72.7</u>	68.8	14.6	<u>1.63</u>	<u>67.9</u>	<u>13.8</u>	<u>0.38</u>	<u>3.3</u>	59.5	4.31	2.5	<u>3.5</u>	3.3	4.3	<u>193.3</u>											
N90-0671	56.7	29.5	70.1	67.3	13.7	1.69	<u>67.9</u>	12.8	0.44	<u>3.0</u>	57.0	5.50	3.3	1.0	<u>5.3</u>	<u>5.0</u>	<u>193.5</u>											
N90-0666	57.5	31.0	61.7	67.3	14.3	1.75	<u>68.7</u>	13.5	0.45	<u>3.3</u>	59.8	4.38	2.8	0.0	<u>4.0</u>	4.8	<u>196.3</u>											
N90-0700	56.6	26.5	<u>79.6</u>	<u>75.3</u>	14.3	<u>1.60</u>	65.4	13.5	<u>0.39</u>	<u>3.5</u>	<u>61.4</u>	4.50	3.0	<u>3.5</u>	<u>4.0</u>	4.8	<u>201.0</u>											
N89-0562	57.1	32.7	66.6	64.0	<u>15.7</u>	1.99	62.8	<u>15.1</u>	0.48	2.8	<u>61.1</u>	3.38	3.0	2.8	3.5	<u>5.0</u>	<u>195.8</u>											
N89-0059	54.0	31.0	63.7	57.8	14.4	1.79	64.3	13.7	0.49	2.5	<u>60.6</u>	3.13	2.5	2.3	<u>4.0</u>	4.5	<u>199.3</u>											
N90-0392	56.0	31.6	67.5	66.0	13.5	1.70	66.7	12.6	0.45	2.8	<u>60.2</u>	3.88	2.8	2.8	3.8	4.8	<u>200.3</u>											
N91-3057	54.3	29.3	70.0	57.3	14.1	1.85	62.0	13.5	0.51	2.8	<u>60.4</u>	4.63	2.5	1.8	3.5	4.8	<u>210.3</u>											
BW688	57.4	<u>35.2</u>	60.3	65.0	<u>15.0</u>	<u>1.64</u>	65.0	<u>14.2</u>	0.41	2.0	56.2	4.19	2.8	2.3	<u>4.3</u>	<u>5.3</u>	<u>195.3</u>											
BW173	57.6	31.2	65.1	<u>82.0</u>	<u>16.3</u>	1.80	<u>67.8</u>	<u>15.9</u>	0.41	<u>3.3</u>	<u>62.2</u>	3.42	3.0	<u>3.7</u>	<u>4.0</u>	<u>5.0</u>	<u>196.0</u>											
BW174	57.6	30.2	68.5	<u>79.0</u>	<u>16.2</u>	1.72	<u>68.1</u>	<u>15.8</u>	0.41	<u>3.3</u>	<u>61.7</u>	3.33	3.0	<u>4.0</u>	3.7	<u>5.3</u>	<u>195.0</u>											

		0		3		6	
RATINGS:	DOUGH CHAR (DC):	STICKY-WEAK	PLIABLE	ELASTIC	BUCKY		
	CRUMB COLOR (CC):	YELLOW	GREY	DULL	CREAMY		
	CRUMB GRAIN (CG):	IRREG, THICK	OPEN, THICK	COARSE	BRIGHT WHITE		
	CRUMB TEXTURE (CT):	HARSH			FINE		

Bolded/underlined values indicate averages are higher than standard, except for Wheat and Flour Ash where bolded/underlined values are lower than standard.
No comparisons are made with Mix Time and Dough Characteristics.

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 21

FARGO, ND

Average of locations in *Southeast* region

VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR	WHEAT		FLOUR		MIX PAT	BAKE		MIX TIME (min)	D		C		C		LOAF VOL (cc)
			HARDNESS INDEX	NESS		PRO	ASH (14% mb)	EXT (%)	PRO		ASH (14 % mb)	ABS		C	C	C	C	G	T	
Std	Butte 86	60.7	33.4	69.8	74.8	14.8	1.77	65.9	13.3	0.39	2.8	60.1	3.71	3.0	3.3	3.7	5.0			187.3
	Marquis	58.3	27.3	<u>70.0</u>	65.0	14.7	1.90	64.9	<u>13.8</u>	0.45	2.8	58.5	3.92	2.8	3.3	<u>4.2</u>	4.5			<u>191.2</u>
	Chris	59.8	28.1	67.1	68.5	<u>15.3</u>	1.86	65.2	<u>14.6</u>	0.43	2.8	59.4	3.75	3.0	<u>3.8</u>	<u>4.2</u>	4.8			<u>193.8</u>
	Era	58.5	27.2	<u>72.6</u>	64.0	13.8	1.86	65.4	12.4	0.43	2.5	56.6	5.21	3.0	3.2	<u>4.5</u>	5.0			<u>198.0</u>
	Stoa	58.8	29.5	<u>72.6</u>	67.2	<u>14.9</u>	1.88	65.1	<u>13.9</u>	0.41	<u>4.2</u>	60.0	4.95	3.0	<u>3.4</u>	<u>4.2</u>	5.0			<u>204.8</u>
	SD0007	59.5	31.7	65.8	65.5	14.3	1.80	<u>67.9</u>	13.1	0.40	2.8	59.8	3.75	2.8	3.3	<u>4.2</u>	4.7			<u>203.0</u>
	SD0010	60.1	29.7	<u>71.5</u>	70.0	14.4	<u>1.74</u>	<u>68.6</u>	13.0	<u>0.36</u>	<u>4.8</u>	60.0	5.33	3.3	<u>4.2</u>	<u>3.8</u>	4.3			<u>189.7</u>
	SD0014	59.1	31.6	67.0	68.7	14.2	1.79	<u>67.2</u>	12.9	<u>0.38</u>	<u>3.5</u>	59.1	4.75	3.3	<u>3.5</u>	3.7	4.7			<u>193.0</u>
	SD3151	59.8	30.0	<u>71.8</u>	60.0	<u>15.5</u>	1.87	61.1	<u>14.4</u>	0.44	<u>3.0</u>	58.5	5.21	3.3	3.3	3.3	<u>5.2</u>			<u>193.2</u>
	SD3156	<u>61.3</u>	31.5	64.7	58.8	14.5	1.85	64.0	12.8	<u>0.36</u>	<u>3.7</u>	58.3	4.58	3.2	2.8	<u>4.7</u>	5.0			185.3
	SBE0437	59.2	31.6	67.2	67.0	14.1	1.81	<u>68.1</u>	12.7	<u>0.39</u>	2.8	59.6	3.92	2.8	<u>3.8</u>	<u>4.2</u>	4.7			<u>194.7</u>
	MN90138	58.3	<u>36.6</u>	<u>71.5</u>	<u>84.5</u>	<u>15.3</u>	2.00	63.3	<u>13.4</u>	0.53	<u>3.0</u>	59.5	4.71	3.3	<u>4.3</u>	<u>4.5</u>	<u>5.2</u>			<u>193.5</u>
	MN91277	58.4	30.4	64.2	47.1	14.3	1.94	60.5	13.3	0.45	1.4	55.6	3.70	3.4	2.0	<u>4.4</u>	4.8			<u>192.6</u>
	MN91309	59.9	31.5	66.6	66.3	14.5	1.78	65.8	13.1	0.41	<u>3.7</u>	59.1	5.21	2.7	<u>3.5</u>	3.7	4.7			185.0
	MN91324	60.4	30.3	<u>73.0</u>	<u>76.6</u>	14.8	1.84	<u>66.1</u>	<u>13.6</u>	0.45	<u>3.6</u>	<u>60.1</u>	4.20	3.0	<u>4.0</u>	3.4	4.8			<u>198.8</u>
	MN92006	<u>61.0</u>	32.9	56.6	59.6	14.4	<u>1.75</u>	<u>67.1</u>	<u>13.5</u>	<u>0.38</u>	2.2	56.3	3.80	2.8	<u>4.2</u>	3.6	4.4			186.2
	SBE0050	59.0	29.7	<u>71.7</u>	56.3	14.3	1.86	64.1	13.2	0.44	<u>4.7</u>	<u>60.9</u>	5.33	3.0	<u>3.8</u>	<u>3.8</u>	5.0			<u>200.8</u>
	ND673	<u>61.2</u>	<u>34.1</u>	69.6	68.0	14.8	<u>1.74</u>	<u>66.9</u>	<u>13.5</u>	<u>0.39</u>	<u>4.6</u>	<u>60.8</u>	5.10	3.0	<u>3.6</u>	3.4	4.8			<u>202.6</u>
	ND674	<u>61.2</u>	31.0	<u>70.7</u>	71.0	<u>15.7</u>	1.86	<u>66.6</u>	<u>14.9</u>	0.42	<u>5.2</u>	<u>61.1</u>	5.42	3.0	3.0	3.3	<u>5.3</u>			<u>207.8</u>

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 21(cont)

FARGO, ND

Average of locations in *Southeast* region

VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR	WHEAT		FLOUR		MIX PAT	BAKE ABS	MIX TIME (min)	D C							
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RATINGS:		0				3				6			
		STICKY-WEAK		PLIABLE		ELASTIC		CREAMY		BUCKY		BRIGHT WHITE	
		YELLOW	IRREG, THICK	GREY	DULL	OPEN, THICK	COARSE	CREAMY	BUCKY	BRIGHT WHITE	FINE	SILKY	
DOUGH CHAR (DC):													
CRUMB COLOR (CC):													
CRUMB GRAIN (CG):													
CRUMB TEXTURE (CT):													

Bolded/underlined values indicate averages are higher than standard, except for Wheat and Flour Ash where bolded/underlined values are lower than standard.
No comparisons are made with Mix Time and Dough Characteristics.

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 22

FARGO, ND

Average of locations in <i>Midwest</i> region																			
VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR	WHEAT		FLOUR		MIX PAT	BAKE ABS	MIX TIME (min)	D	C	C	C	T	LOAF VOL (cc)	
			HARD- INDEX	NESS		PRO	ASH (14% mb)	EXT (%)	PRO										ASH (14 % mb)
Std Butte 86	61.2	33.0	72.6	74.8	13.5	1.51	66.2	12.0	0.36	2.3	57.6	4.25	1.8	3.8	2.8	3.5	165.0		
Marquis	<u>61.5</u>	31.7	68.5	<u>75.7</u>	13.1	1.60	66.0	<u>12.1</u>	0.38	<u>2.3</u>	57.5	3.83	2.0	3.0	<u>4.7</u>	3.3	<u>172.0</u>		
Chris	59.9	28.7	71.3	<u>75.0</u>	<u>13.5</u>	<u>1.50</u>	65.6	<u>12.7</u>	0.36	2.3	56.7	3.88	3.3	3.0	<u>3.0</u>	3.3	<u>177.3</u>		
Era	59.1	29.6	<u>74.6</u>	69.5	12.1	1.53	65.7	10.8	0.40	2.0	53.8	6.50	3.3	<u>4.0</u>	2.5	2.3	<u>166.5</u>		
Stoa	61.0	30.9	<u>74.0</u>	<u>75.0</u>	13.1	1.56	<u>66.5</u>	11.9	<u>0.36</u>	<u>2.8</u>	<u>58.3</u>	5.00	2.3	3.8	<u>4.0</u>	<u>4.3</u>	<u>174.3</u>		
SD0007	61.1	31.7	69.1	68.0	12.8	<u>1.49</u>	<u>68.4</u>	11.7	<u>0.35</u>	<u>2.8</u>	<u>58.0</u>	5.38	2.5	3.5	<u>3.8</u>	<u>3.8</u>	<u>177.3</u>		
SD0010	<u>61.5</u>	31.1	<u>73.3</u>	<u>76.3</u>	13.2	<u>1.48</u>	<u>69.0</u>	11.9	<u>0.33</u>	<u>3.8</u>	<u>59.7</u>	5.31	2.3	3.5	<u>4.5</u>	<u>4.0</u>	<u>167.8</u>		
SD0014	60.7	32.5	68.8	74.3	13.1	<u>1.48</u>	<u>68.2</u>	11.9	<u>0.33</u>	<u>2.8</u>	<u>58.0</u>	5.50	1.8	<u>4.0</u>	<u>4.3</u>	<u>4.3</u>	<u>168.3</u>		
SD3151	<u>61.8</u>	31.1	<u>74.2</u>	70.0	<u>14.6</u>	1.55	63.7	<u>13.9</u>	0.40	2.3	57.2	5.19	1.8	2.0	<u>3.3</u>	3.5	<u>170.5</u>		
SD3156	<u>62.7</u>	31.9	67.6	62.3	13.2	1.55	65.8	<u>12.1</u>	<u>0.32</u>	<u>2.5</u>	57.6	4.75	1.8	2.5	<u>3.0</u>	3.3	<u>167.5</u>		
SBE0437	60.6	31.4	72.2	71.5	13.1	1.53	<u>67.4</u>	11.8	<u>0.36</u>	<u>2.8</u>	56.6	5.44	1.8	<u>4.3</u>	<u>4.3</u>	3.3	<u>167.0</u>		
MN90138	60.8	<u>37.1</u>	<u>74.5</u>	<u>83.0</u>	13.2	1.60	64.5	11.5	0.45	<u>2.8</u>	<u>58.0</u>	6.19	1.5	<u>4.3</u>	2.3	3.3	162.5		
MN91277	<u>61.4</u>	32.6	67.2	53.0	12.7	1.52	64.1	11.9	0.37	1.3	54.7	4.75	1.5	<u>4.0</u>	2.5	2.3	157.8		
MN91309	<u>61.8</u>	<u>33.4</u>	66.7	66.0	<u>13.5</u>	<u>1.48</u>	<u>66.9</u>	<u>12.3</u>	0.36	<u>3.3</u>	<u>58.3</u>	5.44	1.8	3.8	<u>3.5</u>	<u>4.5</u>	<u>167.0</u>		
MN91324	<u>62.4</u>	30.4	<u>76.3</u>	<u>81.8</u>	13.4	<u>1.51</u>	<u>67.2</u>	<u>12.1</u>	0.39	<u>2.8</u>	<u>59.1</u>	4.00	2.0	3.8	<u>4.8</u>	<u>3.8</u>	<u>178.5</u>		
MN92006	<u>62.8</u>	<u>33.2</u>	64.9	70.3	12.8	1.54	<u>67.8</u>	11.9	<u>0.34</u>	2.3	55.5	4.81	1.8	3.8	<u>3.8</u>	2.5	<u>168.5</u>		
SBE0050	<u>61.6</u>	31.3	<u>72.9</u>	64.8	12.5	1.52	65.1	11.5	0.38	<u>2.8</u>	56.0	6.50	1.8	3.8	<u>3.3</u>	3.0	<u>170.8</u>		
ND673	61.1	32.1	71.7	67.0	<u>13.5</u>	1.56	<u>66.3</u>	<u>12.7</u>	<u>0.35</u>	<u>3.3</u>	<u>59.6</u>	5.63	2.8	3.5	<u>3.3</u>	<u>4.8</u>	<u>185.3</u>		
ND674	<u>61.7</u>	30.7	<u>75.4</u>	71.5	<u>14.2</u>	1.59	65.8	<u>13.3</u>	0.38	<u>4.0</u>	<u>59.4</u>	6.00	2.8	3.0	<u>3.3</u>	<u>4.5</u>	<u>184.0</u>		

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USDA / ARS
WHEAT QUALITY LAB

Table 22(cont)

FARGO, ND

Average of locations in *Midwest* region

VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR	WHEAT		FLOUR		MIX PAT	BAKE ABS	MIX TIME (min)	D	C	C	C	G	T	LOAF VOL (cc)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			HARDNESS INDEX	NESS		PRO	ASH (14% mb)	EXT (%)	FLOUR PRO (14 % mb)											ASH (14 % mb)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

RATINGS:	0						3			6		
	DOUGH CHAR (DC):			STICKY-WEAK			PLIABLE			ELASTIC		
	CRUMB COLOR (CC):			YELLOW			GREY			DULL		
	CRUMB GRAIN (CG):			IRREG, THICK			OPEN, THICK			CREAMY		
	CRUMB TEXTURE (CT):			HARSH			COARSE			BRIGHT WHITE		
										FINE		
										SILKY		

Bolded/underlined values indicate averages are higher than standard, except for Wheat and Flour Ash where bolded/underlined values are lower than standard.
No comparisons are made with Mix Time and Dough Characteristics.

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 23

Average of locations in <i>West</i> region										FARGO, ND										Table 23						
VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR		WHEAT		FLOUR		FLOUR		MIX		BAKE		MIX		D	Rating-----						LOAF VOL (cc)
			HARDNESS	INDEX	HARD-	NESS	PRO	ASH (14% mb)	EXT (%)	PRO		ASH (14 % mb)	PAT	ABS	TIME (min)	C	C	C		G	T					
Std Butte 86	60.0	31.3	80.1	76.4	14.8	1.55	66.5	13.8	0.38	2.6	61.5	3.90	2.0	3.2	5.0	4.6								176.6		
Marquis	59.0	31.0	71.6	75.3	<u>15.1</u>	1.65	65.7	<u>14.4</u>	0.41	<u>2.8</u>	59.0	4.00	2.5	<u>3.5</u>	4.0	4.3								<u>181.8</u>		
Chris	59.7	28.1	76.1	71.3	<u>15.0</u>	<u>1.53</u>	65.5	<u>14.4</u>	0.38	2.5	58.9	3.88	2.0	<u>3.5</u>	4.3	4.3								175.5		
Era	59.4	28.1	<u>81.1</u>	73.4	13.7	1.59	<u>67.1</u>	12.5	0.41	2.2	57.6	5.25	2.0	<u>3.4</u>	4.8	4.0								<u>182.0</u>		
Stoa	59.2	30.0	74.9	71.3	<u>14.9</u>	1.57	<u>66.9</u>	<u>14.2</u>	0.39	<u>3.5</u>	60.7	4.88	2.3	2.5	5.0	<u>4.8</u>								<u>188.0</u>		
SD0007	59.4	29.9	76.5	<u>77.6</u>	14.5	1.56	<u>69.3</u>	13.2	0.38	<u>2.8</u>	59.8	4.10	2.4	<u>3.6</u>	4.4	4.2								<u>189.0</u>		
SD0010	59.9	29.4	<u>82.8</u>	<u>76.6</u>	14.4	<u>1.48</u>	<u>68.5</u>	13.2	<u>0.37</u>	<u>3.2</u>	60.5	4.90	2.4	<u>3.8</u>	4.8	<u>5.0</u>								<u>186.8</u>		
SD0014	59.6	31.2	74.3	74.8	14.4	<u>1.54</u>	<u>68.7</u>	13.2	<u>0.37</u>	<u>2.8</u>	58.9	4.45	2.0	<u>3.8</u>	3.8	3.4								<u>178.8</u>		
SD3151	59.7	28.1	<u>89.5</u>	73.2	<u>15.6</u>	<u>1.53</u>	64.8	<u>15.0</u>	0.42	<u>2.8</u>	60.1	4.40	2.4	<u>3.8</u>	4.0	<u>4.8</u>								<u>182.0</u>		
SD3156	<u>61.5</u>	30.4	73.6	58.4	14.0	<u>1.50</u>	<u>66.9</u>	13.0	<u>0.33</u>	<u>2.8</u>	58.5	4.95	2.0	2.2	3.4	<u>4.8</u>								174.2		
SBE0437	59.7	30.9	75.7	<u>78.2</u>	14.4	<u>1.52</u>	<u>68.2</u>	13.2	<u>0.37</u>	2.6	59.3	4.40	2.6	<u>3.8</u>	4.0	4.6								<u>184.0</u>		
MN90138	59.3	<u>36.8</u>	74.7	<u>88.0</u>	<u>15.3</u>	1.69	65.0	<u>14.0</u>	0.50	2.4	60.7	4.60	2.8	<u>4.6</u>	4.4	4.6								<u>180.0</u>		
MN91277	59.7	30.2	73.8	54.0	13.8	1.61	65.7	13.2	0.40	1.6	55.5	3.70	2.0	<u>3.4</u>	4.4	4.0								176.0		
MN91309	<u>60.0</u>	<u>32.9</u>	74.6	71.6	14.6	<u>1.51</u>	<u>67.0</u>	13.5	0.39	<u>3.4</u>	60.7	4.80	2.6	<u>4.2</u>	4.4	<u>5.0</u>								<u>182.6</u>		
MN91324	<u>60.2</u>	29.1	<u>82.9</u>	<u>83.2</u>	14.7	1.58	<u>66.8</u>	13.6	0.44	<u>3.4</u>	60.8	4.35	2.6	<u>3.6</u>	4.2	<u>5.0</u>								<u>187.6</u>		
MN92006	<u>60.8</u>	30.5	73.6	75.2	14.0	<u>1.51</u>	<u>69.4</u>	13.1	<u>0.36</u>	2.4	56.9	4.50	2.0	<u>4.2</u>	4.2	3.6								174.0		
SBE0050	59.7	29.5	76.8	65.2	13.8	<u>1.52</u>	66.1	13.1	0.39	<u>3.4</u>	58.5	6.30	3.0	<u>4.0</u>	3.8	4.6								<u>182.8</u>		
ND673	<u>60.2</u>	30.6	76.9	70.6	<u>14.9</u>	<u>1.53</u>	<u>67.1</u>	<u>14.2</u>	<u>0.37</u>	<u>3.4</u>	60.8	5.30	3.0	<u>3.8</u>	3.6	<u>4.8</u>								<u>192.4</u>		
ND674	<u>60.1</u>	30.2	78.2	74.8	<u>15.2</u>	1.58	65.5	<u>14.7</u>	0.42	<u>3.6</u>	61.3	5.40	2.6	1.8	4.8	<u>5.0</u>								<u>187.8</u>		

1994 Spring Uniform Regional Nursery

USDA / ARS
WHEAT QUALITY LAB

Table 23(cont)

FARGO, ND

Average of locations in <i>West</i> region																		FARGO, ND									
VARIETY	TW (lb/bu)	KWT (gr)	SKWCS		NIR	WHEAT		FLOUR		FLOUR		MIX PAT	BAKE ABS	MIX TIME (min)	D	Rating-----				LOAF VOL (cc)							
			HARDNESS INDEX	INDEX		PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	C					C	C	G	T								
ND677	<u>61.2</u>	30.4	67.6		64.0	<u>14.8</u>	<u>1.55</u>	<u>67.7</u>	<u>14.2</u>	<u>0.38</u>	<u>3.0</u>	60.4	4.80	3.0	<u>3.6</u>	3.8	<u>5.0</u>	<u>197.4</u>									
ND678	<u>61.0</u>	28.0	<u>81.7</u>		76.2	<u>15.1</u>	<u>1.50</u>	65.8	<u>14.2</u>	<u>0.37</u>	<u>2.8</u>	<u>62.1</u>	3.80	3.0	<u>4.0</u>	4.2	<u>5.0</u>	<u>190.6</u>									
ND686	<u>60.6</u>	30.5	73.5		68.8	14.2	<u>1.48</u>	<u>68.0</u>	13.3	<u>0.37</u>	<u>2.8</u>	59.4	5.10	2.8	3.2	3.8	4.6	<u>193.6</u>									
N90-0671	58.3	29.6	74.0		<u>80.8</u>	14.3	1.62	66.4	13.3	0.41	<u>3.0</u>	58.0	6.05	2.8	2.4	4.0	3.8	172.4									
N90-0666	<u>60.0</u>	<u>31.6</u>	68.5		<u>88.2</u>	14.6	1.64	<u>68.6</u>	<u>13.9</u>	0.43	<u>3.2</u>	60.7	4.60	2.4	2.4	4.2	4.6	<u>179.4</u>									
N90-0700	<u>60.3</u>	27.7	<u>86.2</u>		<u>84.4</u>	<u>14.8</u>	<u>1.47</u>	63.8	13.7	0.40	2.6	60.9	3.75	2.8	3.2	3.8	<u>5.0</u>	<u>192.0</u>									
N89-0562	59.8	<u>32.6</u>	74.5		<u>77.2</u>	<u>15.5</u>	1.76	64.9	<u>14.6</u>	0.47	2.0	58.4	3.70	2.6	3.0	4.6	4.6	<u>180.6</u>									
N89-0059	58.4	<u>32.1</u>	71.0		73.2	14.1	1.60	<u>66.7</u>	13.1	0.44	2.0	59.1	3.75	2.4	<u>3.4</u>	4.0	4.2	<u>183.6</u>									
N90-0392	59.2	<u>31.5</u>	74.5		<u>78.4</u>	14.2	1.57	66.3	13.1	0.42	<u>3.2</u>	60.3	4.75	2.6	3.2	3.8	4.6	<u>187.4</u>									
N91-3057	58.4	31.2	71.3		67.2	13.3	<u>1.51</u>	65.9	12.3	0.43	<u>2.8</u>	57.9	5.50	2.2	<u>3.4</u>	3.8	3.8	<u>181.6</u>									
BW688	59.8	<u>32.8</u>	<u>87.6</u>		76.0	<u>15.1</u>	<u>1.47</u>	<u>67.2</u>	<u>14.3</u>	0.42	<u>3.5</u>	<u>61.5</u>	4.25	3.0	<u>3.5</u>	3.5	<u>5.5</u>	<u>201.0</u>									
WPB926	<u>60.5</u>	<u>41.8</u>	51.1		34.5	<u>15.1</u>	1.61	64.8	<u>14.4</u>	<u>0.37</u>	<u>3.0</u>	60.2	4.50	3.0	<u>4.0</u>	3.5	<u>5.5</u>	<u>194.0</u>									
Centennial	<u>61.6</u>	<u>34.8</u>	21.7		40.0	13.2	<u>1.42</u>	56.9	11.3	<u>0.33</u>	1.0	53.3	2.88	2.0	3.0	4.0	4.0	<u>185.0</u>									
Vandal	59.2	29.5	63.0		61.0	<u>15.3</u>	1.60	66.3	<u>14.4</u>	<u>0.38</u>	<u>3.0</u>	59.9	4.63	3.0	3.0	4.0	<u>5.0</u>	<u>206.5</u>									

		0				3				6			
RATINGS:	DOUGH CHAR (DC):	STICKY-WEAK		PLIABLE		ELASTIC		BUCKY					
	CRUMB COLOR (CC):	YELLOW		GREY		DULL		CREAMY		BRIGHT WHITE			
	CRUMB GRAIN (CG):	IRREG, THICK				OPEN, THICK				FINE			
	CRUMB TEXTURE (CT):	HARSH				COARSE				SILKY			

Bolded/underlined values indicate averages are higher than standard, except for Wheat and Flour Ash where bolded/underlined values are lower than standard.
No comparisons are made with Mix Time and Dough Characteristics.

1994 SPRING WHEAT QUALITY REPORT

CASSELTON,ND

FIELD PLOTS

USDA/WHEAT QUALITY LAB

FARGO, ND

Table 24

VARIETY	TW (lb bu)	KWT (grams)	LG (%)	SM (%)	SKWCS HARDNESS				NIR HARD- NESS	WHEAT		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C C C				LOAF VOL (cc)		
					DISTRIBUTION					PRO (14% mb)	ASH (%)	PRO (14 % mb)	ASH (%)					Rating-----						
					A	B	C	D										INDEX	EXT	PRO	ASH		C	C
GRANDIN	60.0	36.8	81	0	0	1	13	86	73.9	100	14.7	1.55	73.8	13.7	0.43	60.0	4	59.7	4.50	3	5	4	4	830
LEN	57.1	31.9	54	1	1	3	9	87	73.6	82	14.1	1.59	73.5	13.3	0.47	59.0	4	58.5	5.75	3	4	4	4	820
2375	59.5	35.7	62	1	0	6	21	73	67.5	90	14.0	1.69	73.8	13.1	0.46	59.3	3	58.8	3.50	3	5	5	5	790
KULM	60.7	31.3	59	1	0	4	20	76	69.4	92	14.6	1.61	73.4	13.7	0.34	61.1	4	60.5	3.50	3	5	5	5	870
STOA	57.4	29.9	45	1	0	0	8	92	79.6	85	14.3	1.68	72.4	13.6	0.42	61.4	5	60.6	4.50	3	3	5	4	855
BUTTE86	58.5	32.6	58	1	0	1	7	92	79.6	94	14.3	1.60	71.3	13.2	0.41	58.2	3	57.5	4.00	2	4	4	4	785

DISTRIBUTION:

A= % Soft

B= % Semi-Soft

C= % Semi-Hard

D= % Hard

RATINGS:

DOUGH CHAR (DC):

CRUMB COLOR (CC):

CRUMB GRAIN (CG):

CRUMB TEXTURE (CT):

0

3

6

STICKY-WEAK

YELLOW

IRREG, THICK

HARSH

PLIABLE

GREY

OPEN, THICK

COARSE

ELASTIC

DULL

CREAMY

BRIGHT WHITE

BUCKY

FINE

SILKY

1994 SPRING WHEAT QUALITY REPORT

USDA/WHEAT QUALITY LAB
FARGO, ND

Table 25

LANGDON,ND
FIELD PLOTS

FIELD PLOTS																										
VARIETY	TW (lb/bu)	KWT (grams)	LG (%)	SM (%)	SKWCS HARDNESS					NIR HARD- NESS	WHEAT		FLOUR		FLOUR		MIX ABS	MIX PAT	BAKE ABS	MIX TIME (min)	D C C C					LOAF VOL (cc)
					DISTRIBUTION						PRO	ASH (14% mb)	EXT (%)	PRO	ASH (14 % mb)	Rating-----										
					A	B	C	D	INDEX							C					C	C	C	T		
GRANDIN	55.9	30.9	54	2	0	3	7	19	71.0	75	14.5	1.62	72.2	13.4	0.44	60.0	4		59.2	4.00	3	1	3	3	905	
LEN	55.8	29.0	44	3	0	2	3	10	85.0	64	14.4	1.70	72.8	13.7	0.44	59.6	4		58.6	4.50	3	1	3	1	875	
2375	60.7	36.3	65	1	0	3	10	29	58.0	78	14.2	1.54	72.4	13.3	0.40	60.8	3		60.0	3.00	2	3	5	4	845	
KULM	56.7	29.1	35	3	0	6	7	26	61.0	79	15.5	1.54	70.5	14.9	0.44	61.1	3		60.1	3.00	2	1	3	3	870	
STOA	56.8	29.2	42	3	0	1	4	15	80.0	79	14.8	1.57	71.6	14.1	0.42	60.5	3		59.5	3.50	2	1	4	3	855	

DISTRIBUTION: A = % Soft
B = % Semi-Soft
C = % Semi-Hard
D = % Hard

RATINGS:												0 3 6					
DOUGH CHAR (DC):				STICKY-WEAK				PLIABLE				ELASTIC				BUCKY	
CRUMB COLOR (CC):				YELLOW				GREY				DULL				BRIGHT WHITE	
CRUMB GRAIN (CG):				IRREG, THICK				OPEN, THICK				COARSE				FINE	
CRUMB TEXTURE (CT):				HARSH												SILKY	

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MINOT,ND

FIELD PLOTS

USDA/WHEAT QUALITY LAB
FARGO, ND

Table 26

VARIETY	TW (lb/bu)	KWT (grams)	LG (%)	SM (%)	SKWCS HARDNESS				NIR		WHEAT		FLOUR		FLOUR		MIX ABS	BAKE ABS	MIX TIME (min)	D	C	C	LOAF VOL (cc)	
					DISTRIBUTION				HARD- NESS	PRO	ASH (14% mb)	EXT (%)	PRO		ASH (14 % mb)									
					A	B	C	D					INDEX	PRO	ASH									
																Rating								Rating
GRANDIN	61.7	38.6	82	0	0	0	4	10	86.0	82	13.5	1.54	74.2	12.8	0.35	57.6	4	56.7	6.00	6	6	3	3	770
LEN	61.0	35.9	76	0	0	0	1	9	90.0	90	13.5	1.56	74.8	12.7	0.38	59.6	4	58.8	6.00	2	5	2	3	820
2375	61.3	37.2	63	1	0	0	2	18	80.0	84	12.1	1.46	73.1	11.3	0.37	57.9	3	57.0	5.00	6	6	4	4	735
KULM	61.9	36.1	76	1	0	1	8	24	67.0	83	14.3	1.68	72.8	13.4	0.38	60.5	4	59.7	4.00	3	6	3	3	850
STOA	61.3	34.0	61	1	0	0	1	9	90.0	99	12.2	1.44	72.6	11.5	0.32	57.9	3	57.2	5.50	3	5	3	3	775

DISTRIBUTION:

A= % Soft
B= % Semi-Soft
C= % Semi-Hard
D= % Hard

RATINGS:

	0			3			6		
	DOUGH CHAR (DC):	STICKY-WEAK	PLIABLE	ELASTIC	CREAMY	BUCKY	DOUGH CHAR (DC):	STICKY-WEAK	PLIABLE
CRUMB COLOR (CO):	CRUMB COLOR (CO):	YELLOW	GREY	DULL	CREAMY	BRIGHT WHITE	CRUMB COLOR (CO):	YELLOW	GREY
CRUMB GRAIN (CG):	CRUMB GRAIN (CG):	IRREG, THICK	OPEN, THICK	OPEN, THICK	OPEN, THICK	FINE	CRUMB GRAIN (CG):	IRREG, THICK	OPEN, THICK
CRUMB TEXTURE (CT):	CRUMB TEXTURE (CT):	HARSH	COARSE	COARSE	COARSE	SILKY	CRUMB TEXTURE (CT):	HARSH	COARSE

